

E | S E R I E S
W I D E S C R E E N



E-Series Widescreen Multifunction Display

Installation instructions

E90W, E120W and E140W models

Raymarine®

SVIB

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ENGLISH

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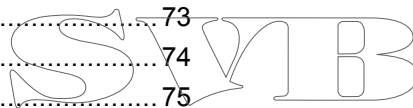
Date: 09-2009

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Chapter 1: Important information



Warning: Product installation and operation

This product must be installed and operated in accordance with the Raymarine instructions provided. Failure to do so could result in personal injury, damage to your boat and/or poor product performance.



Warning: Potential ignition source

This product is NOT approved for use in hazardous/flammable atmospheres. Do NOT install in a hazardous/flammable atmosphere (such as in an engine room or near fuel tanks).



Warning: High voltages

This product contains high voltages. Do NOT remove any covers or otherwise attempt to access internal components, unless specifically instructed in this document.



Warning: Product grounding

Before applying power to this product, ensure it has been correctly grounded, in accordance with the instructions in this guide.



Warning: Switch off power supply

Ensure the boat's power supply is switched OFF before starting to install this product. Do NOT connect or disconnect equipment with the power switched on, unless instructed in this document.



Warning: Radar scanner safety

Before rotating the radar scanner, ensure all personnel are clear.



Warning: Radar transmission safety

The radar scanner transmits electromagnetic energy. Ensure all personnel are clear of the scanner when the radar is transmitting.



Warning: Sonar operation

- NEVER operate the sounder with the boat out of the water.
- NEVER touch the transducer face when the sounder is powered on.
- SWITCH OFF the sounder if divers are likely to be within 25 ft (5 m) of the transducer.



Warning: Touchscreen display

When exposed to prolonged periods of direct sunlight, the touchscreen display can get very hot. In such conditions, avoid using the touchscreen display and use the unit's physical keys and buttons instead.

Caution: Power supply protection

When installing this product ensure the power source is adequately protected by means of a suitably-rated fuse or automatic circuit breaker.

Caution: Use the sun covers

To protect your product against the damaging effects of ultra violet light, always fit the sun covers when the product is not in use.

Caution: Care of chart cards

To avoid irreparable damage to and/or loss of data from chart cards:

- Ensure that chart cards are fitted the correct way around. DO NOT try to force a card into position.
- DO NOT save data (waypoints, routes, and so on) to a chart card, as the charts may be overwritten.
- DO NOT use a metallic instrument such as a screwdriver or pliers to remove a chart card.
- Safe removal. Use the Remove Card menu option before removing the chart card.

Caution: Cleaning

When cleaning this product:

- Do NOT wipe the display screen with a dry cloth, as this could scratch the screen coating.
- Do NOT use abrasive, or acid or ammonia based products.
- Do NOT use a jet wash.

Caution: Ensure chart card door is securely closed

To prevent water ingress and consequent damage to the display, ensure that the chart card door is firmly closed. This can be confirmed by an audible click.

TFT LCD Displays

The colors of the display may seem to vary when viewed against a colored background or in colored light. This is a perfectly normal effect that can be seen with all color Liquid Crystal Displays (LCDs).

In common with all Thin Film Transistor (TFT) LCD units, the screen may exhibit a few (less than 7) wrongly illuminated pixels. These may appear as black pixels in a light area of the screen or as colored pixels in black areas.

Water ingress

Water ingress disclaimer

Although the waterproof rating capacity of Raymarine products exceeds that called for by the IPX6 standard, water intrusion and subsequent equipment failure may occur if any Raymarine equipment is subjected to commercial high pressure washing. Raymarine will not warrant equipment subjected to high pressure washing.

Disclaimers

This product (including the electronic charts) is intended to be used only as an aid to navigation. It is designed to facilitate use of official government charts, not replace them. Only official government charts and notices to mariners contain all the current information needed for safe navigation, and the captain is responsible for their prudent use. It is the user's responsibility to use official government charts, notices to mariners, caution and proper navigational skill when operating this or any other Raymarine product. This product supports electronic charts provided by third party data suppliers which may be embedded or stored on memory card. Use of such charts is subject to the supplier's End-User Licence Agreement included in the documentation for this product or supplied with the memory card (as applicable).

Raymarine does not warrant that this product is error-free or that it is compatible with products manufactured by any person or entity other than Raymarine.

This product uses digital chart data, and electronic information from the Global Positioning System (GPS) which may contain errors. Raymarine does not warrant the accuracy of such information and you are advised that errors in such information may cause the product to malfunction. Raymarine is not responsible for damages or injuries caused by your use or inability to use the product, by the interaction of the product with products manufactured by others, or by errors in chart data or information utilized by the product and supplied by third parties.

CompactFlash cards

Jeppesen and Navionics chart cards

The Display is pre-loaded with Jeppesen electronic charts for your region. If you wish to use different chart data, you can insert Jeppesen or Navionics chart cards into the CompactFlash card slot on the unit.

Use branded chart cards

When archiving data, Raymarine recommends the use of quality branded CF memory cards. Some brands of CF memory card may not work in your unit. Please contact customer support for a list of recommended CF cards.

EMC installation guidelines

Raymarine equipment and accessories conform to the appropriate Electromagnetic Compatibility (EMC) regulations, to minimize electromagnetic interference between equipment and minimize the effect such interference could have on the performance of your system

Correct installation is required to ensure that EMC performance is not compromised.

For **optimum** EMC performance we recommend that wherever possible:

- Raymarine equipment and cables connected to it are:
 - At least 1 m (3 ft) from any equipment transmitting or cables carrying radio signals e.g. VHF radios, cables and antennas. In the case of SSB radios, the distance should be increased to 7 ft (2 m).

- More than 2 m (7 ft) from the path of a radar beam. A radar beam can normally be assumed to spread 20 degrees above and below the radiating element.
- The product is supplied from a separate battery from that used for engine start. This is important to prevent erratic behavior and data loss which can occur if the engine start does not have a separate battery.
- Raymarine specified cables are used.
- Cables are not cut or extended, unless doing so is detailed in the installation manual.

Note: Where constraints on the installation prevent any of the above recommendations, always ensure the maximum possible separation between different items of electrical equipment, to provide the best conditions for EMC performance throughout the installation

Suppression ferrites

Raymarine cables may be fitted with suppression ferrites. These are important for correct EMC performance. If a ferrite has to be removed for any purpose (e.g. installation or maintenance), it must be replaced in the original position before the product is used.

Use only ferrites of the correct type, supplied by Raymarine authorized dealers.

Connections to other equipment

Requirement for ferrites on non-Raymarine cables

If your Raymarine equipment is to be connected to other equipment using a cable not supplied by Raymarine, a suppression ferrite **MUST** always be attached to the cable near the Raymarine unit.

Declaration of conformity

Raymarine Ltd. declares that the E-Series Widescreen Multifunction Displays are in compliance with the essential requirements of EMC directive 2004/108/EC.

The original Declaration of Conformity certificate may be viewed on the relevant product page at www.raymarine.com

Product disposal

Dispose of this product in accordance with the WEEE Directive.



■ The Waste Electrical and Electronic Equipment (WEEE) Directive requires the recycling of waste electrical and electronic equipment. Whilst the WEEE Directive does not apply to some Raymarine products, we support its policy and ask you to be aware of how to dispose of this product.

Warranty registration

To register your E-Series Widescreen multifunction display ownership, please take a few minutes to fill out the warranty registration card found in the box, or visit www.raymarine.com and register on-line.

It is important that you register your product to receive full warranty benefits. Your unit package includes a bar code label indicating the serial number of the unit. You should stick this label to the warranty registration card.

IMO and SOLAS

The equipment described within this document is intended for use on leisure marine boats and workboats not covered by International Maritime Organization (IMO) and Safety of Life at Sea (SOLAS) Carriage Regulations.

Technical accuracy

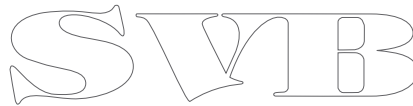
To the best of our knowledge, the information in this document was correct at the time it was produced. However, Raymarine cannot accept liability for any inaccuracies or omissions it may contain. In addition, our policy of continuous product improvement may change specifications without notice. As a result, Raymarine cannot accept liability for any differences between the product and this document.

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Chapter 2: Planning the installation

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- 2.1 Handbook information on page 14
- 2.2 Installation checklist on page 14
- 2.3 E-Series Widescreen system on page 15
- 2.4 System protocols on page 17
- 2.5 Data master on page 18
- 2.6 Pack contents on page 19
- 2.7 Tools on page 20



2.1 Handbook information

This handbook contains important information regarding the E-Series Widescreen range of multifunction displays.

The handbook is for use with the following models:

- E90W Widescreen Multifunction Display
- E120W Widescreen Multifunction Display
- E140W Widescreen Multifunction Display

E-Series handbooks

The E-Series Widescreen Multifunction Display has the following handbooks available:

All documents are available to download as PDFs from www.raymarine.com

E-Series handbooks

Description	Part number
Installation and commissioning instructions	87116
Operating instructions (quick reference)	86137
User reference handbook	81320

Additional handbooks

Description	Part number
SeaTalk ^{ng} reference manual	81300

2.2 Installation checklist

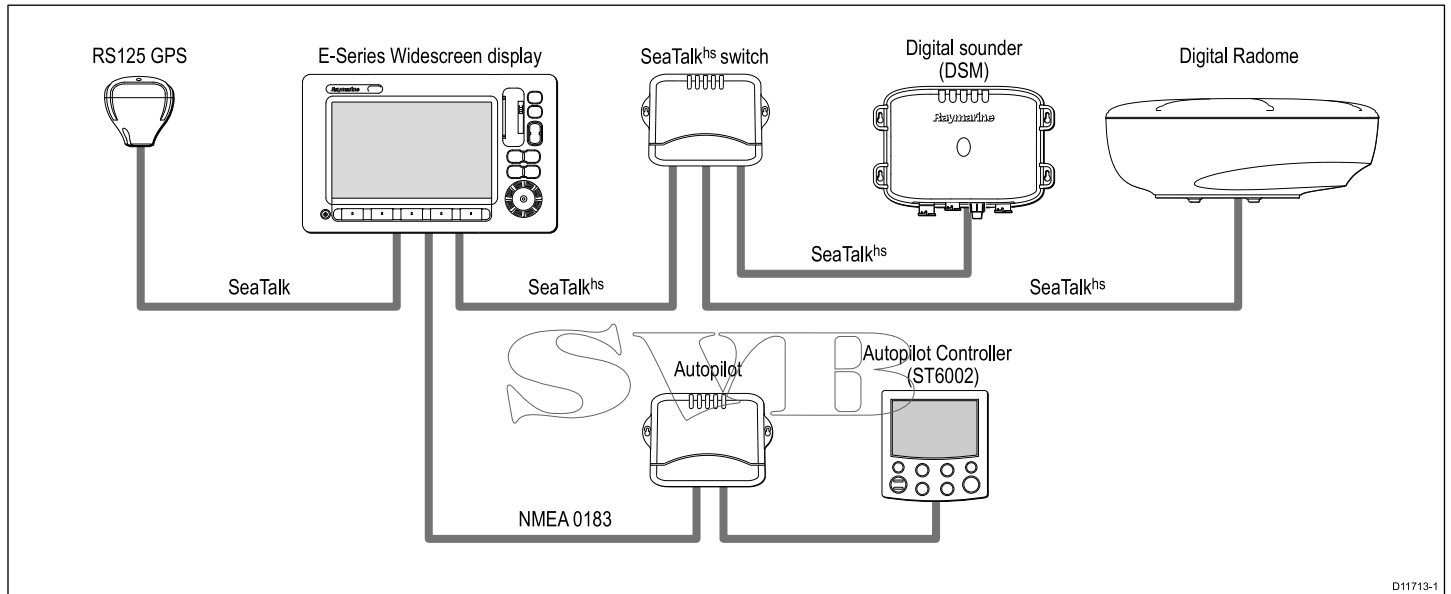
Installation includes the following activities:

Installation Task	
1	Plan your system
2	Obtain all required equipment and tools
3	Site all equipment
4	Route all cables.
5	Drill cable and mounting holes.
6	Make all connections into equipment.
7	Secure all equipment in place.
8	Power on test the system.

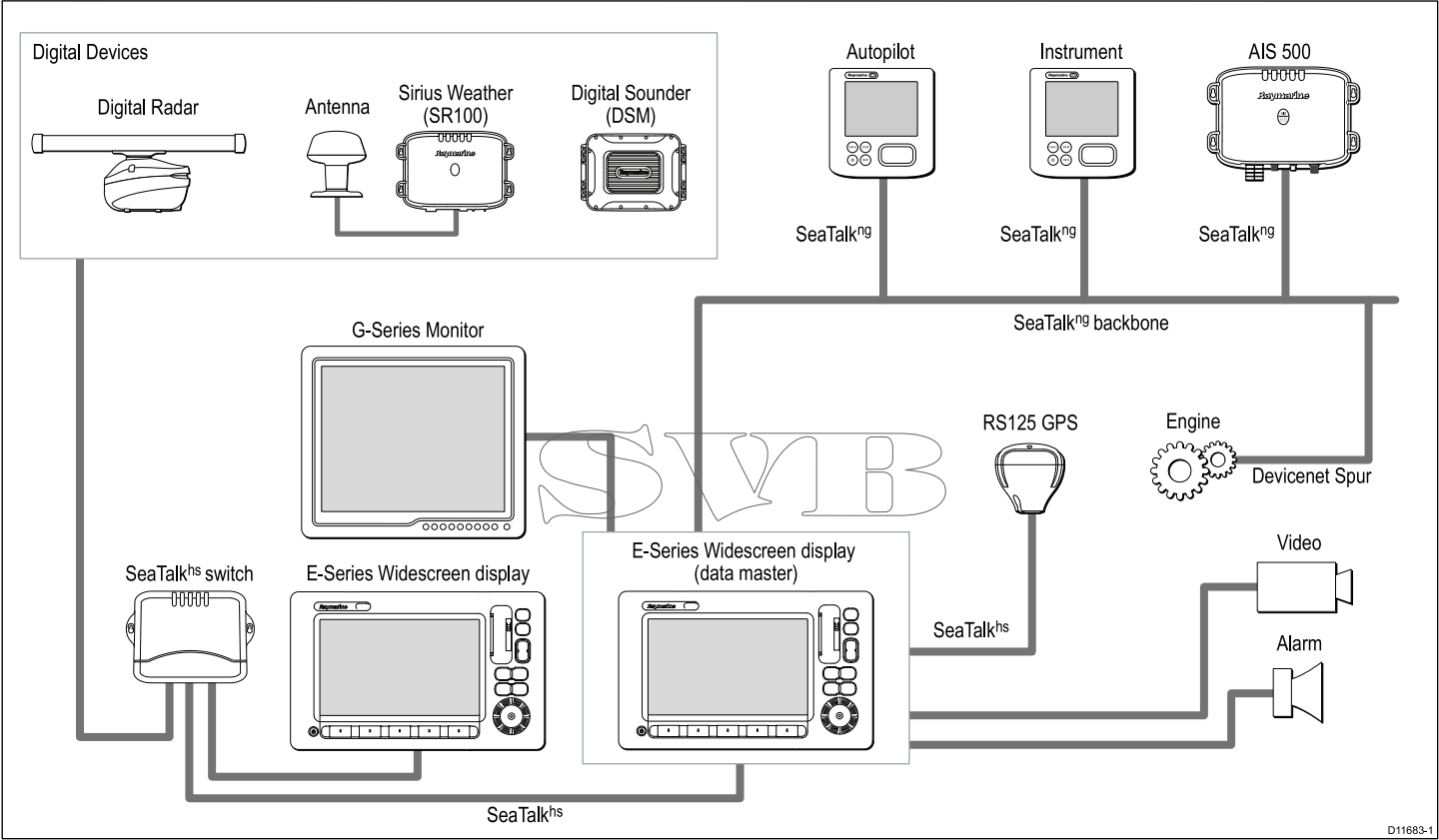
2.3 E-Series Widescreen system

The E-Series Widescreen display can be connected to a variety of equipment as part of your marine electronics system..

Basic system example



Expanded system example



Note: The system allows up to 5 E-Series Widescreen displays to be connected on a SeaTalk^{hs} network.

2.4 System protocols

Your Multifunction Display can connect to various instruments and displays to share information and so improve the functionality of the system. These connections may be made using a number of different protocols. Fast and accurate data collection and transfer is achieved by using a combination of the following data protocols:

- SeaTalk^{hs}
- SeaTalk^{ng}
- NMEA 2000
- SeaTalk
- NMEA 0183

Note: You may find that your system does not use all of the connection types or instrumentation described in this section.

SeaTalk^{hs}

SeaTalk^{hs} is an ethernet based marine network. This high speed protocol allows compatible equipment to communicate rapidly and share large amounts of data.

Information shared using the SeaTalk^{hs} network includes:

- Shared cartography (between compatible displays.
- Digital radar data.
- Sonar data.

Seataalk^{ng}

SeaTalk^{ng} (New Generation) is an enhanced protocol for connection of compatible marine instruments and equipment. It replaces the older SeaTalk and SeaTalk² protocols.

SeaTalk^{ng} utilizes a single backbone cable to which compatible instruments connect using a spur. Data and power are carried within the backbone. Devices that have a low draw can be powered from the network, although high current equipment will need to have a separate power connection.

SeaTalk^{ng} is a proprietary extension to NMEA 2000 and the proven CAN bus technology. Compatible NMEA 2000 and SeaTalk / SeaTalk² devices can also be connected using the appropriate interfaces or adaptor cables as required.

NMEA 2000

NMEA 2000 offers significant improvements over NMEA 0183, most notably in speed and connectivity. Up to 50 units can simultaneously transmit and receive on a single physical bus at any one time, with each node being physically addressable. The standard was specifically intended to allow for a whole network of marine electronics from any manufacturer to communicate on a common bus via standardized message types and formats.

SeaTalk

SeaTalk is a protocol which enables compatible instruments to connect to each other and share data.

The SeaTalk cable system is used to connect compatible instruments and equipment. The cable carries power and data and enables connection without the need for a central processor.

Additional instruments and functions can be added to a SeaTalk system, simply by plugging them into the network. SeaTalk equipment can also communicate with other non-SeaTalk equipment via the NMEA 0183 standard, provided a suitable interface is used.

NMEA 0183

The NMEA 0183 Data Interface Standard was developed by the National Marine Electronics Association of America. It is an

international standard to enable equipment from many different manufacturers to be connected together and share information.

The NMEA 0183 standard carries similar information to SeaTalk. However it has the important difference that one cable will only carry information in one direction. For this reason NMEA 0183 is generally used to connect a data receiver and a transmitter together, e.g. a compass sensor transmitting heading to a radar display. This information is passed in 'sentences', each of which has a three letter sentence identifier. It is therefore important when checking compatibility between items that the same sentence identifiers are used some examples of which are:

- VTG - carries Course and Speed Over Ground data.
- GLL - carries latitude and longitude.
- DBT - carries water depth.
- MWV - carries relative wind angle and wind speed data.

NMEA baud rates

The NMEA 0183 standard operates at a number of different speeds, depending upon the particular requirement or equipment capabilities. Typical examples are:

- 4800 baud rate. Used for general purpose communications, including FastHeading data.
- 9600 baud rate. Used for Navtex.
- 38400 baud rate. Used for AIS and other high speed applications.

2.5 Data master

Any system containing more than one networked multifunction display must have a designated data master.

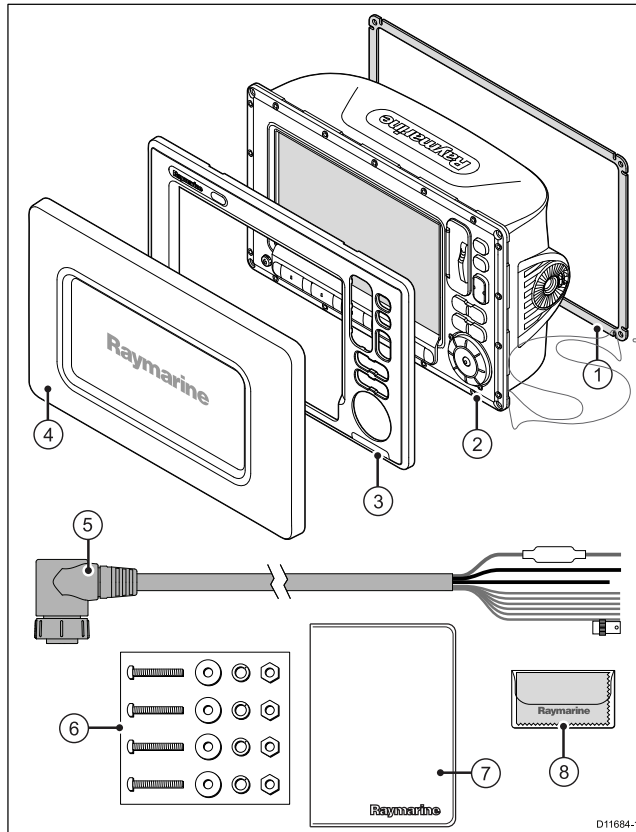
The data master is the display which serves as a primary source of data for all displays, it also handles all external sources of information. For example the displays may require heading information from the autopilot and GPS systems, usually received through a SeaTalk^{ng} or NMEA connection. The data master is the display to which the SeaTalk, NMEA and any other data connections are made, it then bridges the data to the SeaTalk^{hs} network and any compatible repeat displays. Information shared by the data master includes:

- Cartography
- Routes and waypoints
- Radar
- Sonar
- Data received from the autopilot, instruments, the engine and other external sources.

Your system may be wired for redundancy with data connections made to repeat displays. However these connections will only become active in the event of a fault and/or reassignment of the data master.

2.6 Pack contents

All models contain the following items:

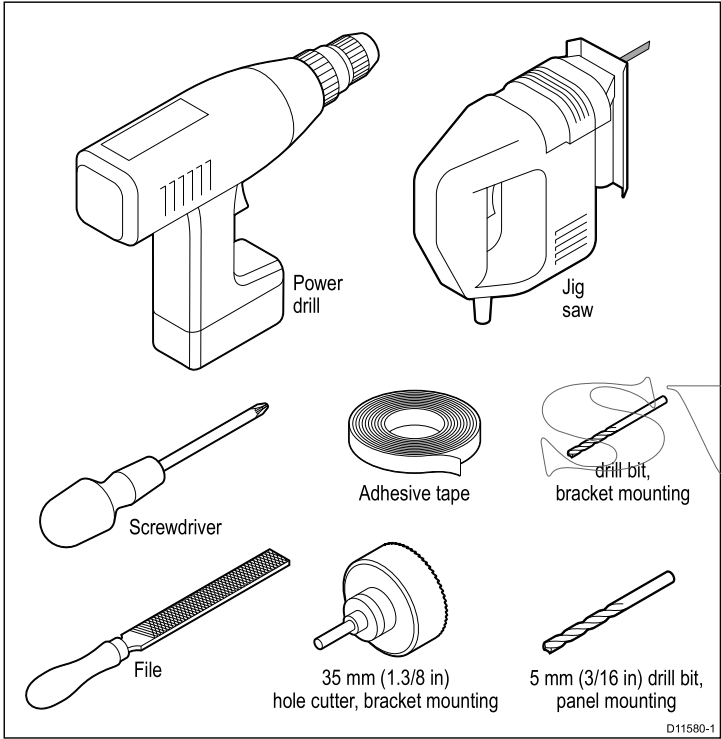


Number	Description
1	Gasket
2	E-Series Widescreen Multifunction Display
3	Bezel
4	Suncover
5	1.5 m (4.9 ft) Power and data cable
6	Screw pack
7	Document pack, includes: <ul style="list-style-type: none">• Multilingual CD• Installation and commissioning instructions• Cutting template• Jeppesen EULA
8	Micro-fiber dry cleaning cloth

Unpack the display unit carefully to prevent damage. Save the carton and packing in case the unit has to be returned for service.

2.7 Tools

Tools required for installation



Chapter 3: Cables and connections

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- [3.1 General cabling guidance on page 22](#)
- [3.2 Connections overview on page 23](#)
- [3.3 Power connection on page 23](#)
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- [3.12 NMEA 2000 connection on page 41](#)
- [3.13 Video and alarm audio connection on page 42](#)



3.1 General cabling guidance

Cable types and length

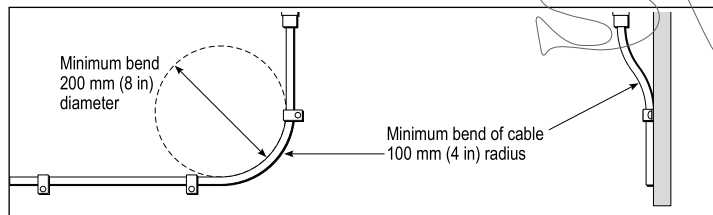
It is important to use cables of the appropriate type and length

- Unless otherwise stated use only standard cables of the correct type, supplied by Raymarine.
- Ensure that any non-Raymarine cables are of the correct quality and gauge. For example, longer power cable runs may require larger wire gauges to minimize voltage drop along the run.

Routing cables

Cables must be routed correctly, to maximize performance and prolong cable life.

- Do NOT bend cables excessively. Wherever possible, ensure a minimum bend radius of 100 mm.



- Protect all cables from physical damage and exposure to heat. Use trunking or conduit where possible. Do NOT run cables through bilges or doorways, or close to moving or hot objects.
- Secure cables in place using tie-wraps or lacing twine. Coil any extra cable and tie it out of the way.
- Where a cable passes through an exposed bulkhead or deckhead, use a suitable watertight feed-through.
- Do NOT run cables near to engines or fluorescent lights.

Always route data cables as far away as possible from:

- other equipment and cables,
- high current carrying ac and dc power lines,
- antennae.

Strain relief

Ensure adequate strain relief is provided. Protect connectors from strain and ensure they will not pull out under extreme sea conditions.

Circuit isolation

Appropriate circuit isolation is required for installations using both AC and DC current:

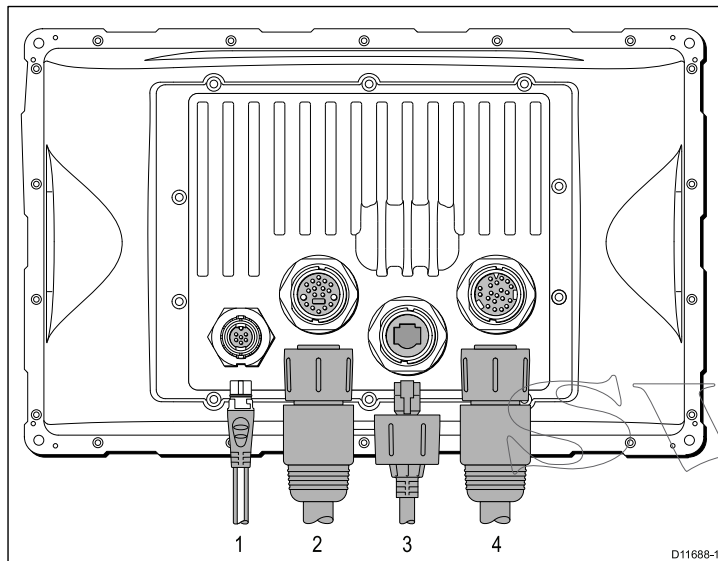
- Always use isolating transformers or a separate power-inverter to run PC's, processors, displays and other sensitive electronic instruments or devices.
- Always use an isolating transformer with Weather FAX audio cables.
- Always use an RS232/NMEA converter with optical isolation on the signal lines.
- Always make sure that PC's or other sensitive electronic devices have a dedicated power circuit.

Cable shielding

Ensure that all data cables are properly shielded that the cable shielding is intact (e.g. hasn't been scraped off by being squeezed through a tight area).

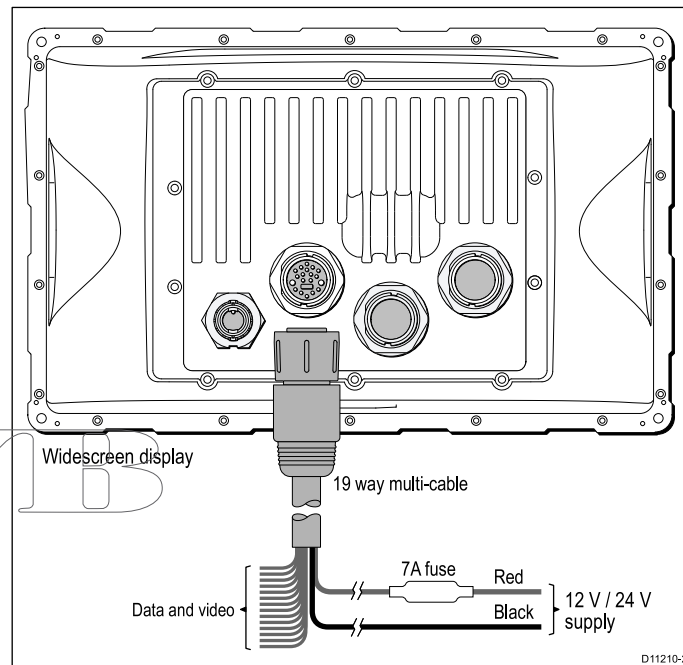
3.2 Connections overview

Cable connectors are on the rear of the display.



1. SeaTalk^{ng}
2. Power, data and 1 x video in
3. SeaTalk^{hs}
4. Additional 3 x Video in, 1 x video out and alarm audio line out

3.3 Power connection



Power distribution

Raymarine recommend that all power connections are made via a distribution panel.

- All equipment must be powered from a breaker or switch, with appropriate circuit protection.
- All equipment should where possible be wired to individual breakers.



Warning: Product grounding

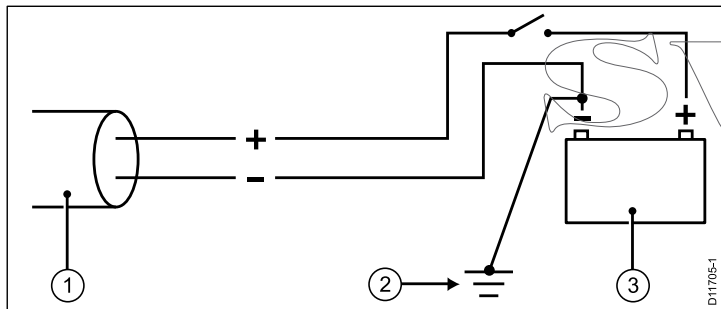
Before applying power to this product, ensure it has been correctly grounded, in accordance with the instructions in this guide.

Grounding

The following requirements apply when grounding Raymarine equipment which does not have a dedicated drain wire or shield:

Common ground point

The negative wire must be connected to a bonded common ground point, i. e. with the ground point connected to battery negative, and situated as close as possible to the battery negative terminal.



1. Power cable to display
2. Bonded common ground connection
3. Battery

Implementation

If several items require grounding, they may be first be connected to a single local point (e.g. within a switch panel), with this point

connected via a single, appropriately-rated conductor, to the boat's common ground.

The preferred minimum requirement for the path to ground (bonded or non-bonded) is via a flat tinned copper braid, with a 30 A rating (1/4 inch) or greater. If this is not possible, an equivalent stranded wire conductor may be used, rated as follows:

- for runs of <1 m (3 ft), use 6 mm² (#10 AWG) (6 mm) or greater.
- for runs of >1 m (3 ft), use 8 mm² (#8 AWG) or greater.

In any grounding system, always keep the length of connecting braid or wires as short as possible.

Important: Do NOT connect this product to a positively-grounded power system.

References

- ISO 10133/13297
- BMEA code of practice
- NMEA 0400

Power cable

The display is supplied with a combined power and data multi cable, this can be extended if required.

Power cable supplied

Cable	Part number	Notes
1.5 m (4.9 ft) Power and data cable	R62131	Supplied with unit

Cable extension

The following restrictions apply to any extension to the power cable:

- Cable must be of a suitable gauge for the circuit load.
- Each unit should have its own dedicated power cable wired back to the distribution panel.

Total length (max)	Supply voltage	Cable gauge (AWG)
0–5 m (0–16.4 ft)	12 V	18
	24 V	20
5–10 m (16.4–32.8 ft)	12 V	14
	24 V	18
10–15 m (32.8–49.2 ft)	12 V	12
	24 V	16
15–20 m (49.2–65.5 ft)	12 V	12
	24 V	14

Note: These distances are for a 2 wire power cable run from the battery to the display (approximately the distance from the battery to the display). To calculate the round trip length, double the figure stated here.

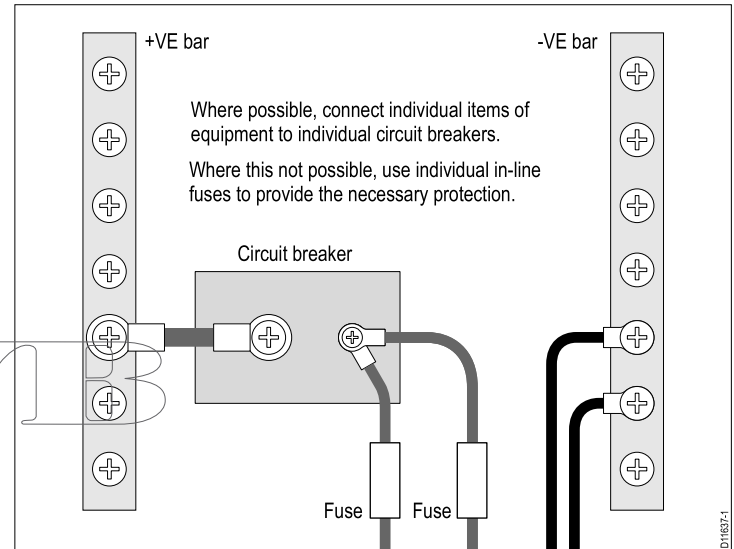
Breakers, fuses and circuit protection

The power cable includes an in-line fuse. It is recommended that you fit an additional thermal breaker or fuse at the distribution panel.

Display	Fuse
<ul style="list-style-type: none"> • C90W / E90W • C120W / E120W • C140W / E140W 	7 A in-line fuse fitted within power cable.

Sharing a breaker

Where more than 1 piece of equipment shares a breaker you must provide protection for the individual circuits. E.g. by connecting an in-line fuse for each power circuit.



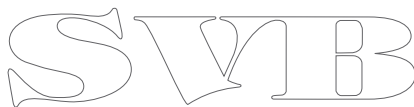
3.4 SeaTalk^{hs} network

The SeaTalk^{hs} network allows you to connect compatible displays and other digital devices.

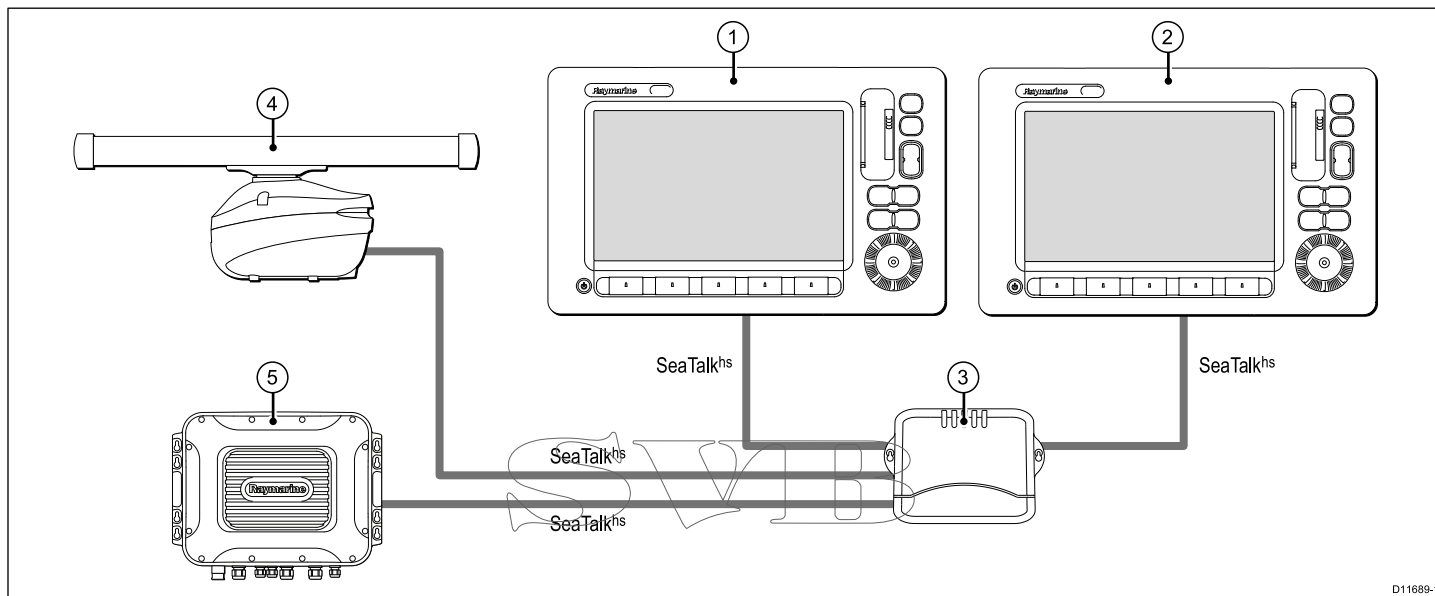
SeaTalk^{hs} can be used with E-Series Widescreen to:

- Create a network of up to 5 E-Series Widescreen displays.
- Connect a digital radar scanner.
- Connect a digital sounder (DSM).

Note: A network containing more than a single connection will require a SeaTalk^{hs} switch. This is a hub used for connection of multiple devices.



Typical SeaTalk^{hs} network



D11689-1

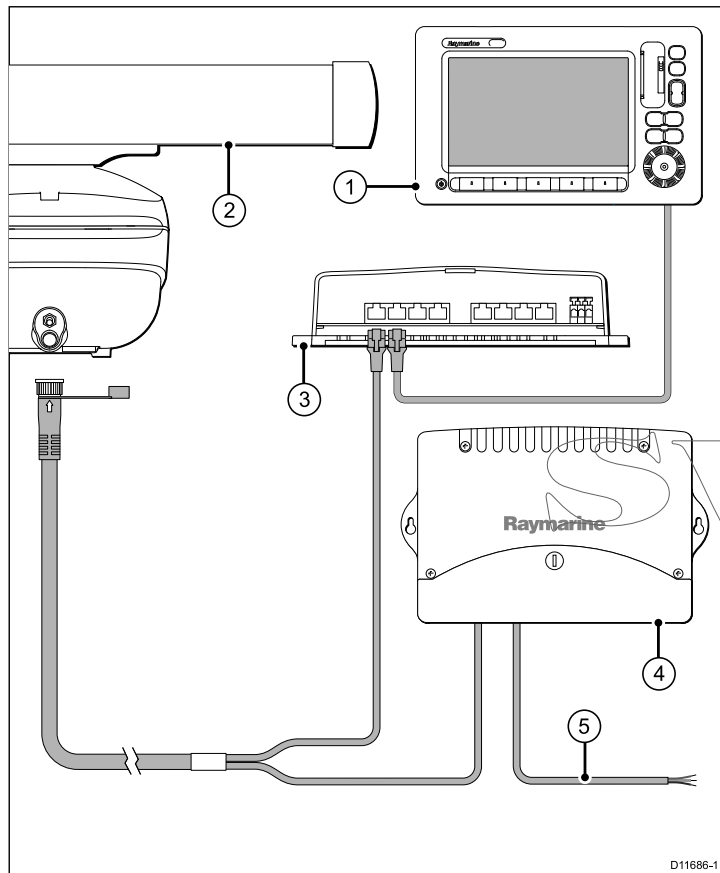
1. Data master display
2. Repeat display
3. SeaTalk^{hs} switch
4. Digital radar scanner
5. Digital sounder, e.g. DSM400

Radar connection

The display is compatible with Raymarine digital radar scanners. The scanner is connected using a SeaTalk^{hs} cable.

The digital radar is usually connected via a SeaTalk^{hs} switch. On smaller systems (with only one display and no other digital devices) the radar may be connected using a crossover coupler.

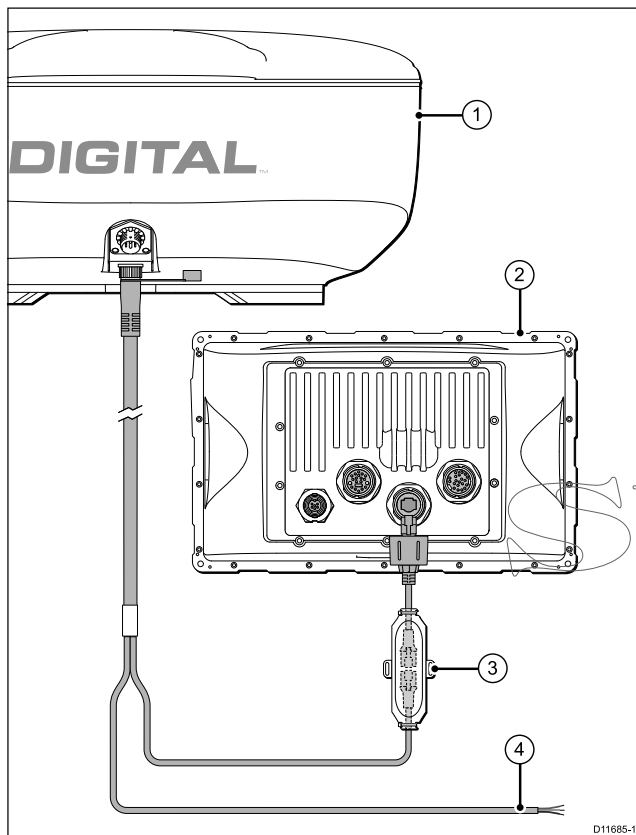
Radar connected using SeaTalk^{hs} switch



2. Digital radar scanner
3. SeaTalk^{hs} switch
4. VCM100 power converter (This is only required with open array type scanners.)
5. Connection to power supply

Radar connected directly to the display

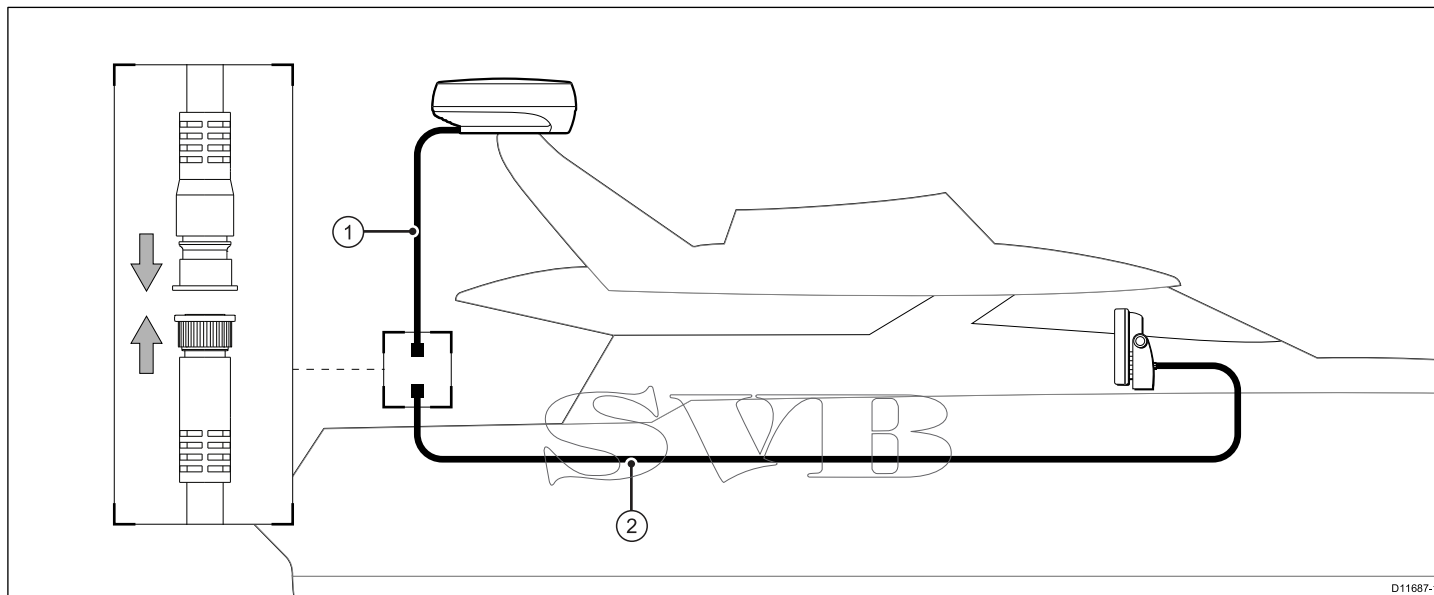
Note: The connector on the free end of the radar cable does not have a locking / weather tight mechanism. The use of a crossover coupler is important to create a weather proof connection.



1. Digital radar scanner
2. Display
3. Crossover coupler
4. Connection to power supply

Digital radar cable extension

If required you can use a Raymarine digital radar extension cable.



1. Extension cable
2. Digital scanner cable

Note: The extension cable connects to the radar scanner.

Digital radar cables

You will need at least 2 cables to connect the digital radar scanner. One cable connects the scanner to a SeaTalk^{hs} switch (or crossover coupler). The second cable then connects into the display.

Note: The maximum cable length including all extensions is 25 m (82 ft).

Radar scanner to SeaTalk^{hs} switch (or crossover coupler)

Digital scanner cables

Connect the Radar scanner to the SeaTalk^{hs} switch (or crossover coupler) and power supply. These cables contain both power and data wires.

Cable	Part number	Notes
5 m (16.4 ft) Digital cable	A55076	
10 m (32.8 ft) Digital cable	A55077	Your radar scanner may include the 10 m cable (depending upon the model purchased)
15 m (49.2 ft) Digital cable	A55078	
25 m (82.0 ft) Digital cable	A55079	

Extension cables

Use of one of these cables to extend the radar connection to the SeaTalk^{hs} switch (or crossover coupler) and power supply. These cables contain both power and data wires.

Cable	Part number	Notes
2.5 m (8.2 ft) extension cable	A92141	
5 m (16.4 ft) extension cable	A55080	
10 m (32.8 ft) extension cable	A55081	

SeaTalk^{hs} switch (or crossover coupler) to display unit

SeaTalk^{hs} network cables

Connect from the SeaTalk^{hs} switch or the crossover coupler into the rear of the display.

Cable	Part number	Notes
1.5 m (4.9 ft) SeaTalk ^{hs} network cable	E55049	
5 m (16.4 ft) SeaTalk ^{hs} network cable	E55050	
10 m (32.8 ft) SeaTalk ^{hs} network cable	E55051	
20 m (65.6 ft) SeaTalk ^{hs} network cable	E55052	

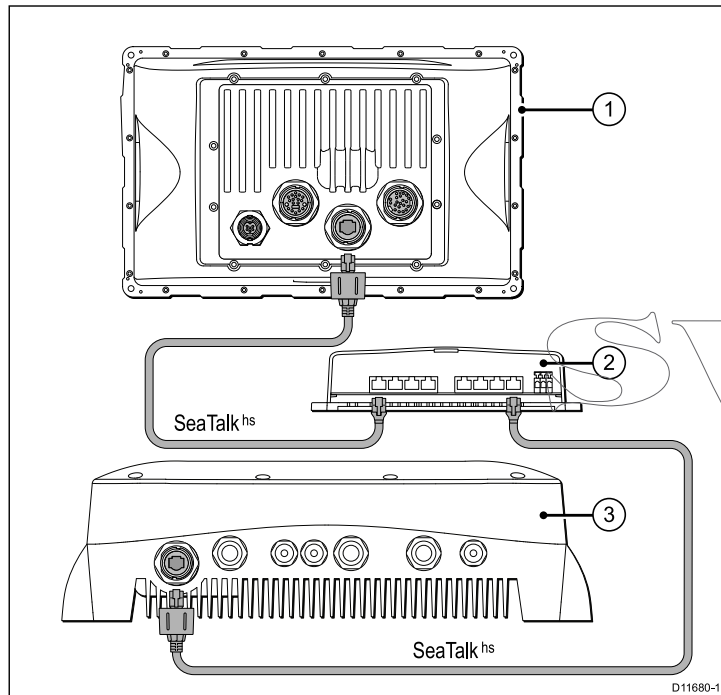
SeaTalk^{hs} hardware

To connect the digital radar to the C-Series display you will need to include one of the following

Cable	Part number	Notes
SeaTalk ^{hs} switch	E55058	8 way hub for network connection of multiple SeaTalk ^{hs} devices.
SeaTalk ^{hs} coupler	E55060	Couple for connection of a single SeaTalk ^{hs} device.

Sonar connection

The sonar connection is required for fishfinder applications. The display is connected to a sonar module (DSM) using a SeaTalk^{hs} cable. You will also require a compatible transducer connected to the DSM unit.



1. Display
2. SeaTalk^{hs} switch
3. DSM unit, e.g. DSM400

The E-Series Widescreen display can be used with the following DSM units:

- DSM400
- DSM300
- DSM30

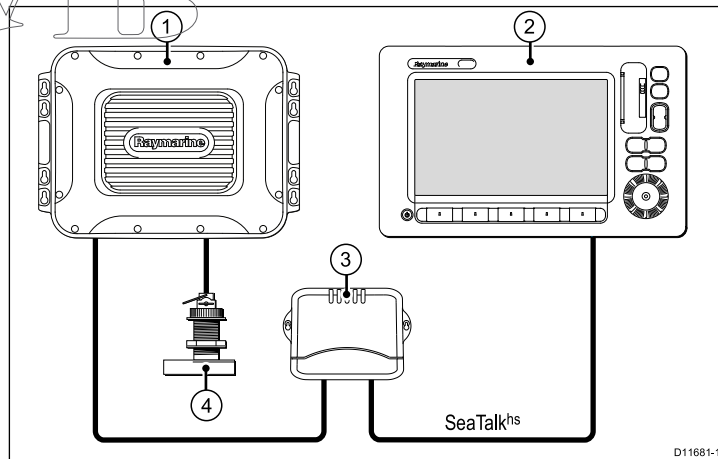
The display can support 1 DSM module.

Sonar connected directly to the display

On smaller systems (with only one display and no other digital devices) the DSM may be connected directly to the display without using a SeaTalk^{hs} switch.

Note: You must ensure that the cable ends connected into the display and DSM have a locking / weather tight mechanism.

Typical DSM system



1. DSM unit, e.g. DSM400
2. Display
3. SeaTalk^{hs} switch
4. Transducer

Sonar cable

Connect the DSM unit directly to your display, or connect via the SeaTalk^{hs} switch.

SeaTalk^{hs} network cables

Connect from the SeaTalk^{hs} switch into the rear of the display.

Cable	Part number	Notes
1.5 m (4.9 ft) SeaTalk ^{hs} network cable	E55049	
5 m (16.4 ft) SeaTalk ^{hs} network cable	E55050	
10 m (32.8 ft) SeaTalk ^{hs} network cable	E55051	
20 m (65.6 ft) SeaTalk ^{hs} network cable	E55052	

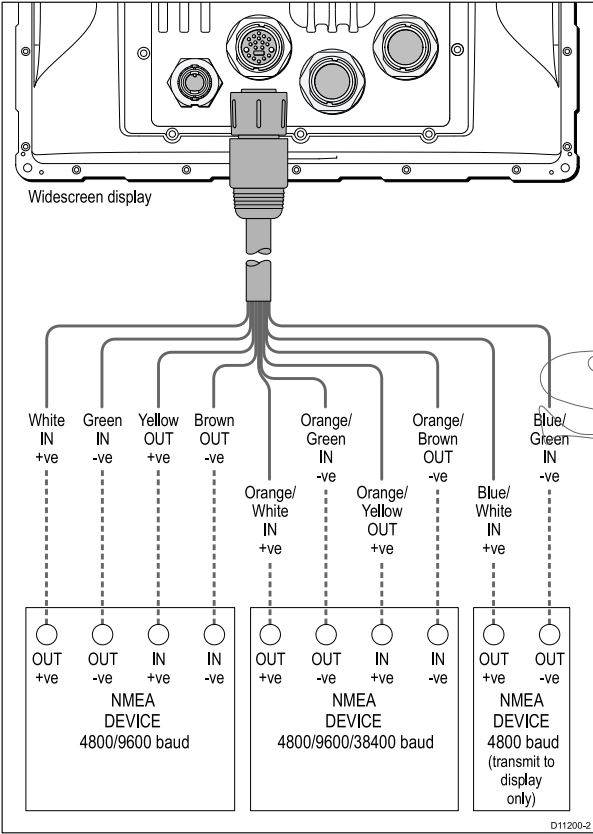
Cable	Part number	Notes
1.5 m (4.9 ft) SeaTalk ^{hs} network cable.	A62245	Cable has waterproof connectors at both ends.
10 m (32.8 ft) SeaTalk ^{hs} network cable	A62246	Cable has waterproof connectors at both ends.

Fully waterproof SeaTalk^{hs} network cables

Connect directly from DSM to the rear of the display.

3.5 NMEA 0183 connection

Connections to NMEA 0183 devices are made using the supplied Power and data cable.



The display has 3 NMEA ports available:

- **Port 1:** Input and output, 4800 / 9600 baud rate.
- **Port 2:** Input and output, up to 38400 baud rate.
- **Port 3:** Input only, 4800 baud rate.

NMEA 0183 cable

You can extend the NMEA 0183 wires within the supplied power and data cable.

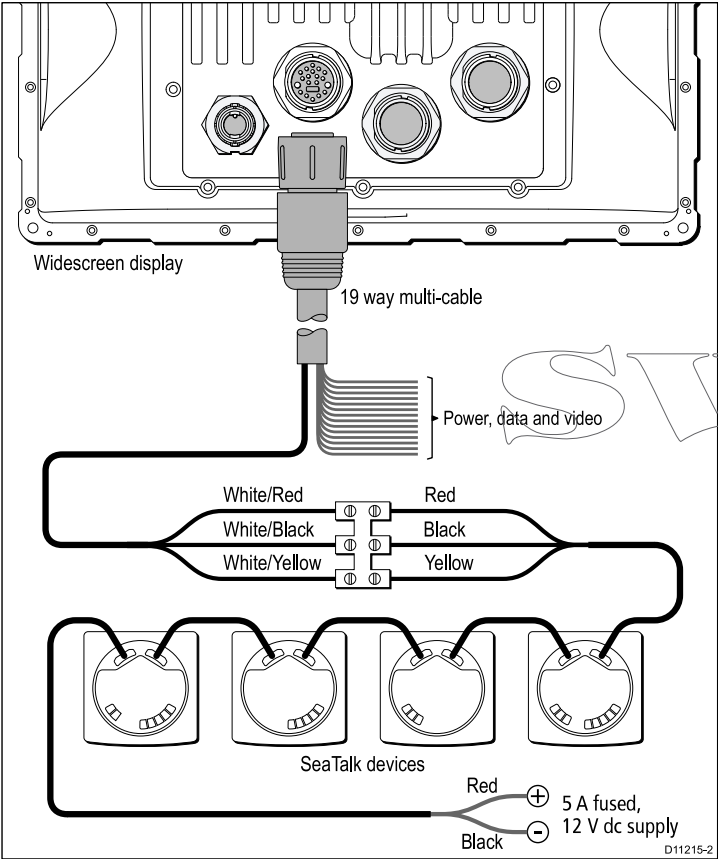
Data cable extension

The following restrictions apply to any extension to the NMEA 0183 data wires.

Total length (max)	Cable
Up to 5 m	High quality data cable: <ul style="list-style-type: none">• 2 x twisted pair with overall shield.• 50 to 75 pF/m capacitance core to core.

3.6 SeaTalk connection

Connections to SeaTalk equipment are made using the supplied multi-cable.



SeaTalk cable

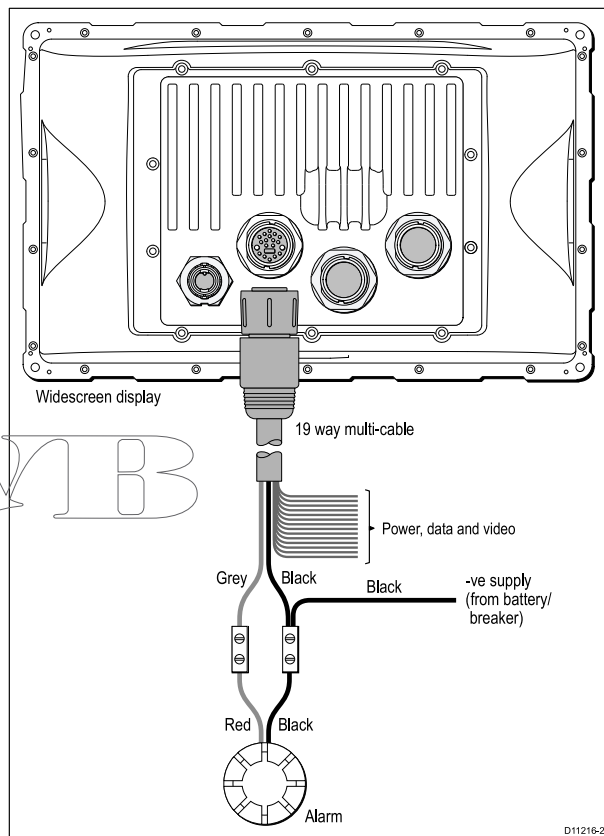
For SeaTalk cables and extensions, use Raymarine SeaTalk cable accessories.

Note: Power to SeaTalk instruments is not provided by the display.

3.7 Alarm connection

An alarm buzzer can be connected using the power / data cable provided with the display.

Typical alarm connection



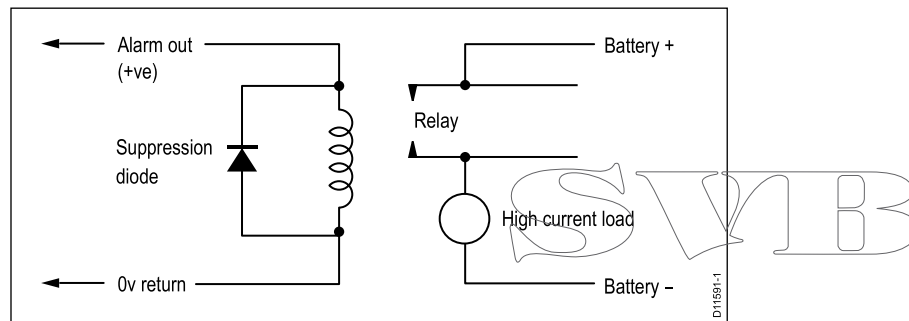
Note: The alarm output is rated for 100 mA maximum load

High alarm loads and third party alarms

You can use the alarm output to switch a relay. This may be useful for connecting high loads such as third party alarm sounders or inductive loads to the display. If you are in any doubt as to how to make such connections please consult an authorized installer.

The E-Series Widescreen multifunction display has a positive switched alarm output. The following circuit shows the arrangement for connection of a relay switch.

Alarm output configured to switch a relay



3.8 GPS connection

Depending upon your GPS type it may be either connected via SeaTalk or NMEA 0183.

See also

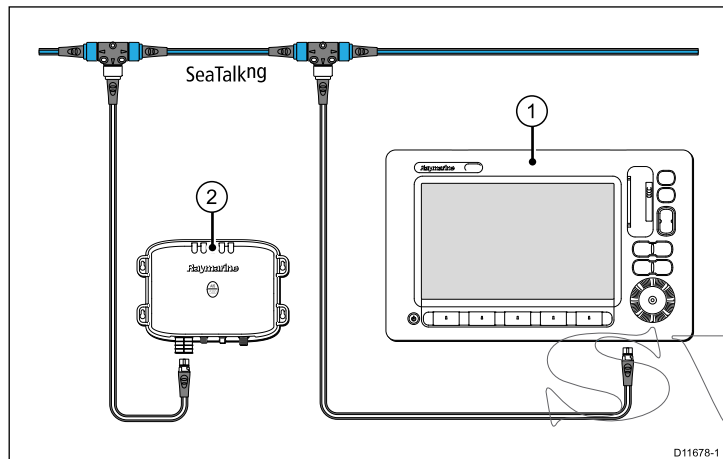
- For SeaTalk connection refer to: [3.6 SeaTalk connection](#).
- For NMEA 0183 connection refer to: [3.5 NMEA 0183 connection](#).

Note: When connecting the output to a relay or other inductive device you should fit a spike suppression diode e.g. 1N4001.

3.9 AIS connection

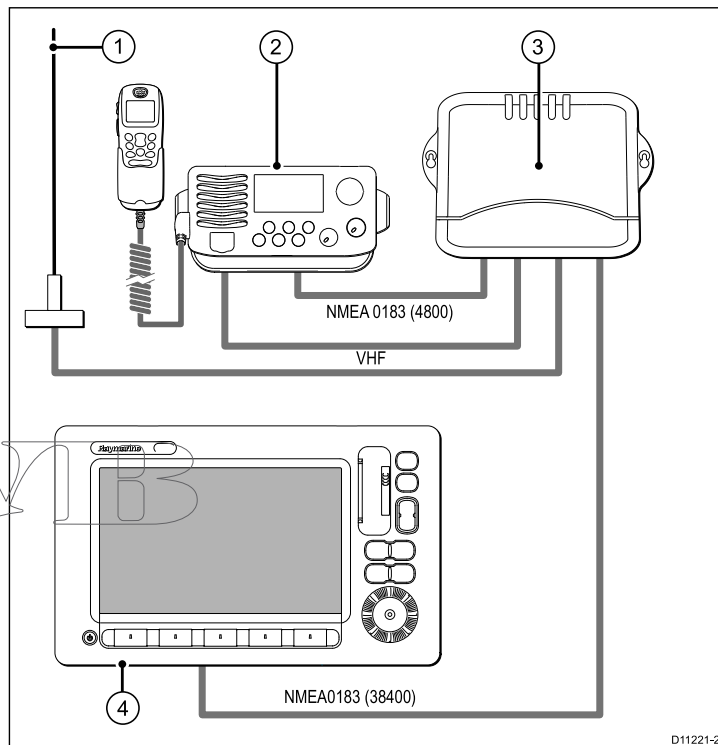
A compatible AIS can be connected using SeaTalk^{ng} or NMEA 0183.

Connection using SeaTalk^{ng}



1. Widescreen display
2. AIS500 transceiver

Connection using NMEA 0183

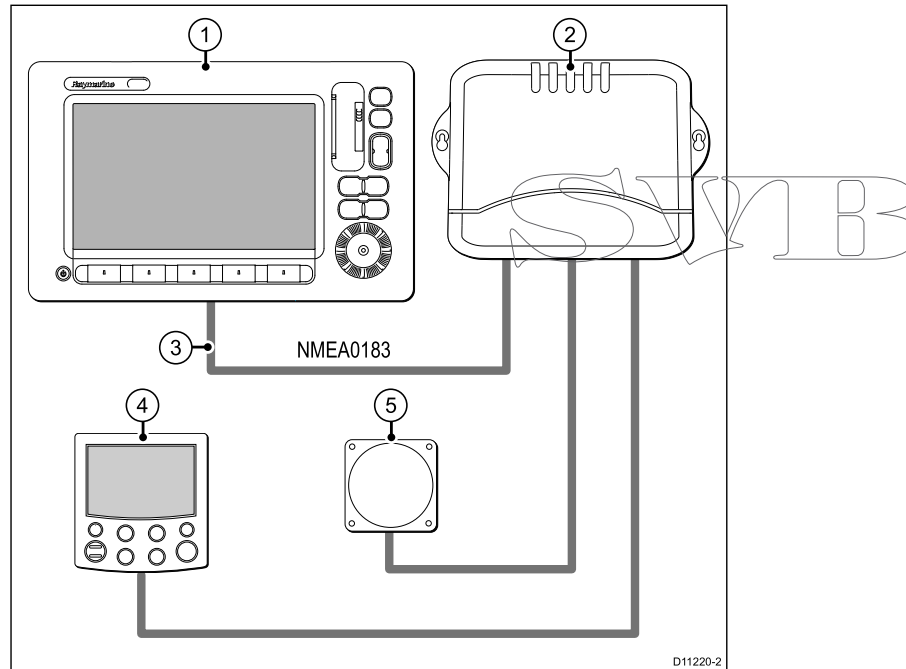


1. VHF antenna
2. VHF radio
3. AIS unit
4. Display

3.10 Fastheading connection

If you wish to use MARPA (radar target acquisition) functions on a system without a SeaTalk^{ng} autopilot then you will require a dedicated Fastheading connection. The connection uses NMEA 0183 and can be made to either a compatible Raymarine autopilot or a dedicated Fastheading sensor. If your system includes a Raymarine SPX course computer connected using SeaTalk^{ng} then you will not need the separate Fastheading connection.

Typical Fastheading from NMEA 0183 compatible autopilot



Note: The connection can be made into any NMEA 0183 port.

1. Display
2. Autopilot course computer
3. Autopilot connected via NMEA 0183 (Fastheading and other relevant data)
4. Autopilot controller
5. Fluxgate compass

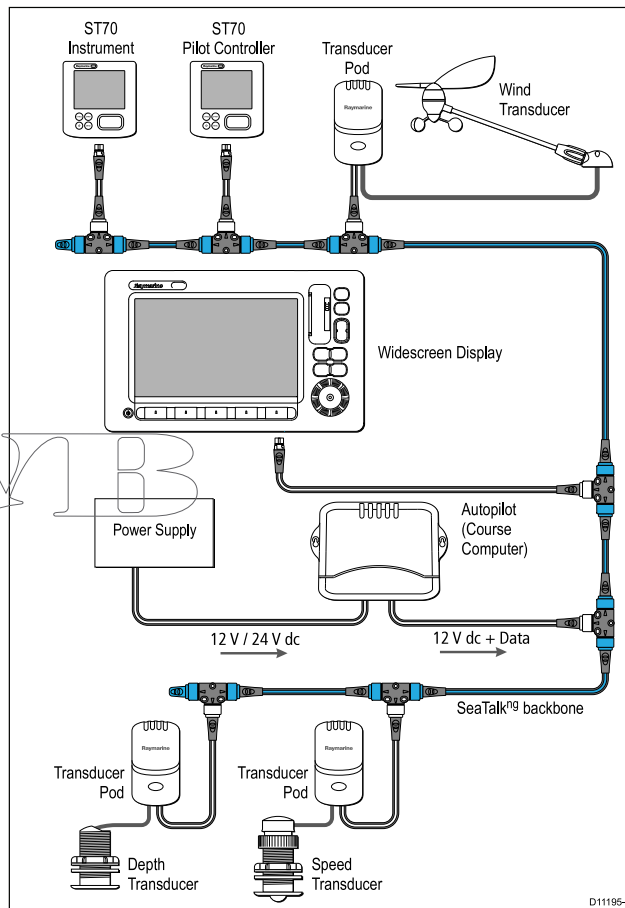
3.11 SeaTalk^{ng} connections

The display can connect as part of a SeaTalk^{ng} network.

The display can use SeaTalk^{ng} to communicate with:

- SeaTalk^{ng} instruments (e.g. ST70)
- SeaTalk^{ng} autopilots (e.g. ST70 with SmartPilot SPX course computer)

Typical SeaTalk^{ng} system



SeaTalk^{ng} cabling

SeaTalk^{ng} cables

Connection / Cable	Notes
Backbone cables (various lengths)	The main cable carrying data. Spurs from the backbone are used to connect SeaTalk ^{ng} devices.
T-piece connectors	Used to make junctions in the backbone to which devices can then be connected.
Terminators	Required at either end of the backbone.
Spur cables	Used to connect devices. Devices may be daisy chained or connected directly to the T-pieces.

Seataalk^{ng} power

The SeaTalk^{ng} bus requires a 12 V power supply. This may be provided from:

- Raymarine equipment with a regulated 12 V supply. (e.g. a SmartPilot SPX course computer)
- Other suitable 12 V supply.

Note: SeaTalk^{ng} does NOT supply power to multifunction displays and other equipment with a dedicated power supply input.

3.12 NMEA 2000 connection

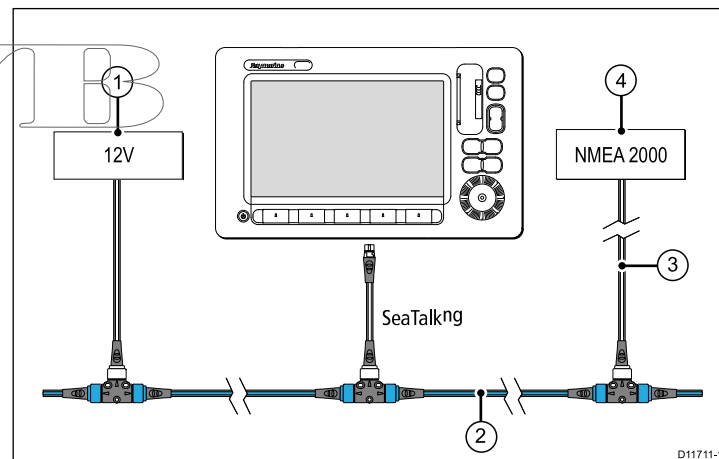
The display can receive data from NMEA 2000 devices (e.g. data from compatible engines). The NMEA 2000 connection is made using SeaTalk^{ng} and appropriate adaptor cables.

You can EITHER:

- Use your SeaTalk^{ng} backbone and connect each NMEA 2000 device on a spur, OR
- connect the display on a spur into an existing NMEA 2000 backbone.

Important: You cannot have 2 backbones connected together.

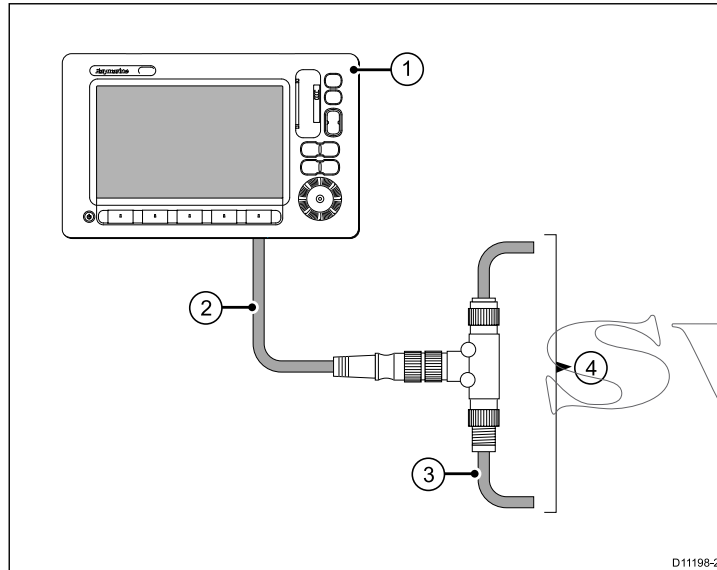
Connecting NMEA 2000 equipment to the SeaTalk^{ng} backbone



1. 12 V supply into backbone
2. SeaTalk^{ng} backbone

3. SeaTalk^{ng} to DeviceNet adaptor cable
4. NMEA 2000 equipment

Connecting the display to an existing NMEA 2000 (DeviceNet) backbone

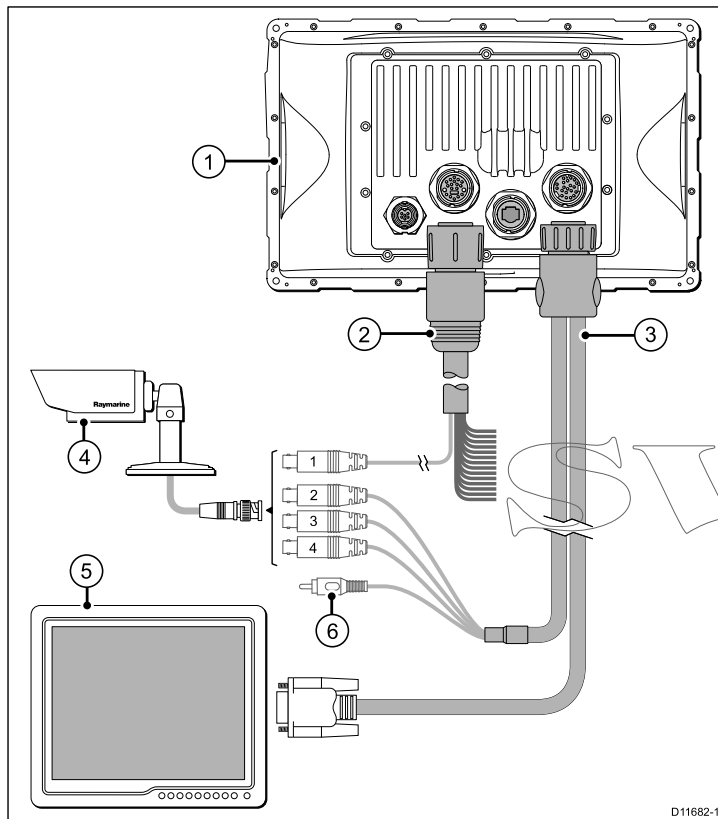


1. Display
2. SeaTalk^{ng} to DeviceNet adaptor cable
3. DeviceNet^{ng} backbone
4. NMEA 2000 equipment

3.13 Video and alarm audio connection

The display supports connection of up to 4 video devices and an external monitor. It also provides an alarm audio output for connection to the ship's audio system.

Video and alarm audio connection



1. Display
2. Power and data cable
3. Audio/Video cable

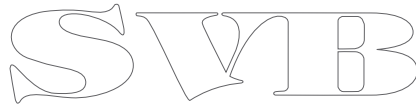
Video and audio cables

Cable	Part number	Notes
1.5 m (4.9 ft) Power and data cable	R62131	Supplied with the display. Provides 1 x video input
5 m (16.4 ft) Video/Alarm audio cable	A62158	Available as an accessory. This cable provides: <ul style="list-style-type: none">• 3 x video input BNC connectors• 1 x VGA video output connector• 1 x RCA phono jack plug (for alarm signalling only) <div>Note: 5 m (16.4 ft) length is for the VGA flying lead only. All other connectors are on leads of 0.5 m (1.6 ft) length.</div>

Chapter 4: Location and mounting

Chapter contents

- [4.1 Selecting a location on page 46](#)
- [4.2 Flush mounting on page 48](#)
- [4.3 Bracket \(trunnion\) mounting on page 49](#)
- [4.4 Front bezel on page 51](#)



4.1 Selecting a location



Warning: Potential ignition source

This product is NOT approved for use in hazardous/flammable atmospheres. Do NOT install in a hazardous/flammable atmosphere (such as in an engine room or near fuel tanks).

General location requirements

When selecting a location for your display it is important to consider a number of factors.

Key factors which can affect product performance are:

• Ventilation

To ensure adequate airflow:

- Ensure that equipment is mounted in a compartment of suitable size.
- Ensure that ventilation holes are not obstructed. Allow adequate separation of equipment.

Any specific requirements for each system component are provided later in this chapter.

• Mounting surface.

Ensure equipment is adequately supported on a secure surface. Do not mount units or cut holes in places which may damage the structure of the vessel.

• Cable entry

Ensure the unit is mounted in a location which allows proper routing and connection of cables:

- Minimum bend radius of 100 mm (3.94 in) unless otherwise stated.

- Use cable supports to prevent stress on connectors.

• Water ingress

The display is suitable for mounting both above and below decks. It is waterproof to IPX6 standard. Although the unit is waterproof, it is good practice to locate it in a protected area away from prolonged and direct exposure to rain and salt spray.

• Electrical interference

Select a location that is far enough away from devices that may cause interference, such as motors, generators and radio transmitters/receivers.

• Magnetic compass

Select a location that is at least 3 ft (1 m) away from a magnetic compass.

• Power supply

Select a location that is as close as possible to the boat's DC power source. This will help to keep cable runs to a minimum

Adequate space for cooling fins

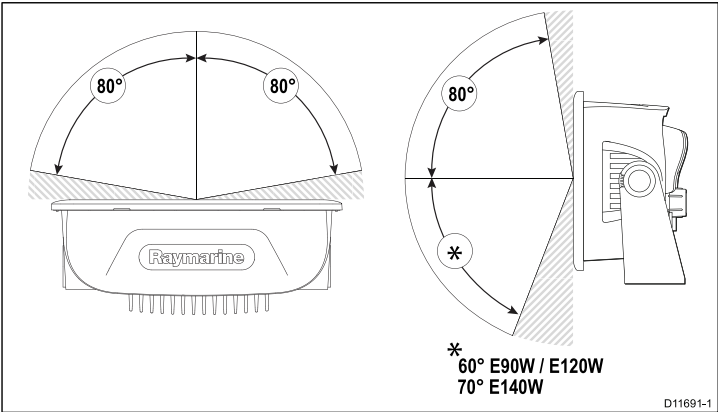
Ensure adequate space around the cooling fins, in particular you must avoid contact with any metal object or surface.

Both the cooling fins on the rear of the display and the screws securing them MUST NOT be in contact with any metal objects including any metallic part of the vessel structure. Failure to adhere to this could result in unwanted current flow and in turn damage to the vessel structure through the process of galvanic corrosion. If this is a concern then the method of mounting must ensure electrical isolation.

Viewing angle considerations

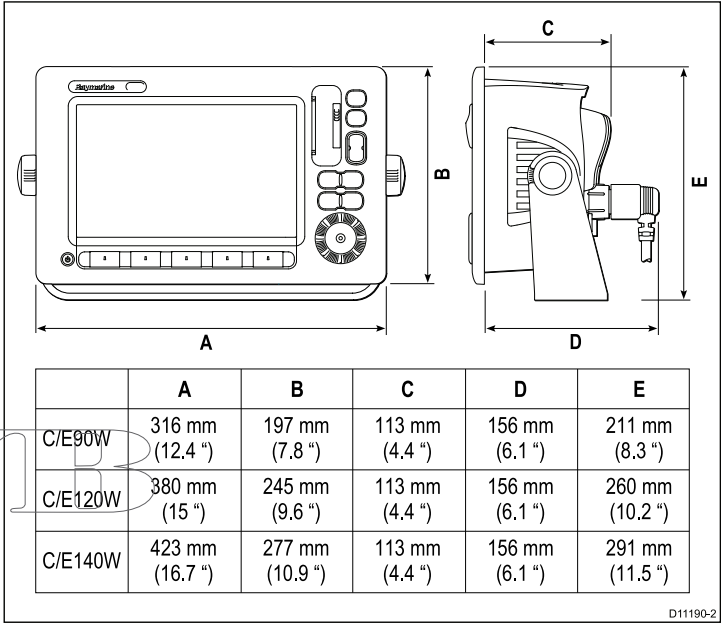
As display contrast, color and night mode performance are all affected by the viewing angle, Raymarine recommends you temporarily power up the display when planning the installation, to enable you to best judge which location gives the optimum viewing angle.

Viewing angle



Note: The angles are provided for a contrast ratio of equal to or greater than 10.

Widescreen display dimensions



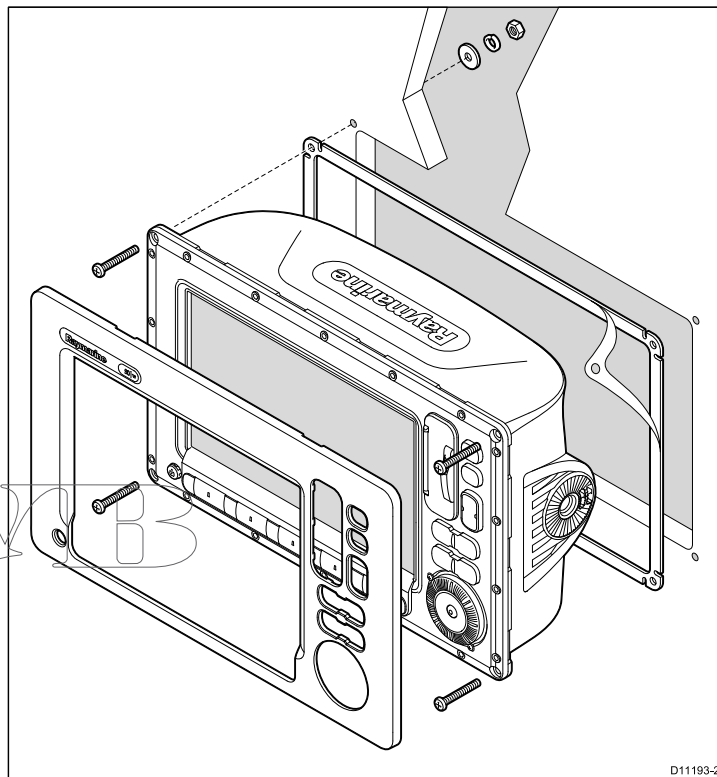
4.2 Flush mounting

The standard method for mounting the display is a flush or panel mounting arrangement.

Before mounting the unit, ensure that you have:

- Selected a suitable location
- Identified the cable connections and route that the cables will take
- Detached the front bezel

SVS



D11193-2

1. Check the selected location for the unit. A clear, flat area with suitable clearance behind the panel, is required.
2. Fix the appropriate cutting template supplied with the product, to the selected location, using masking or self-adhesive tape.
3. Using a suitable hole saw (the size is indicated on the template), make a pilot hole in each corner of the cut-out area.
4. Using a suitable saw, cut along the inside edge of the cut-out line.

5. Ensure that the unit fits into the removed area and then file around the cut edge until smooth.
 6. Drill four 4.5 mm (3/16 in) holes as indicated on the template to accept the securing bolts.
 7. Place the gasket onto the display unit and press firmly onto the flange.
 8. Connect the power, data and other cables to the unit.
 9. Slide the unit into place and secure using bolts provided.
- Once you have secured the display in place, proceed and attach the front bezel.

4.3 Bracket (trunnion) mounting

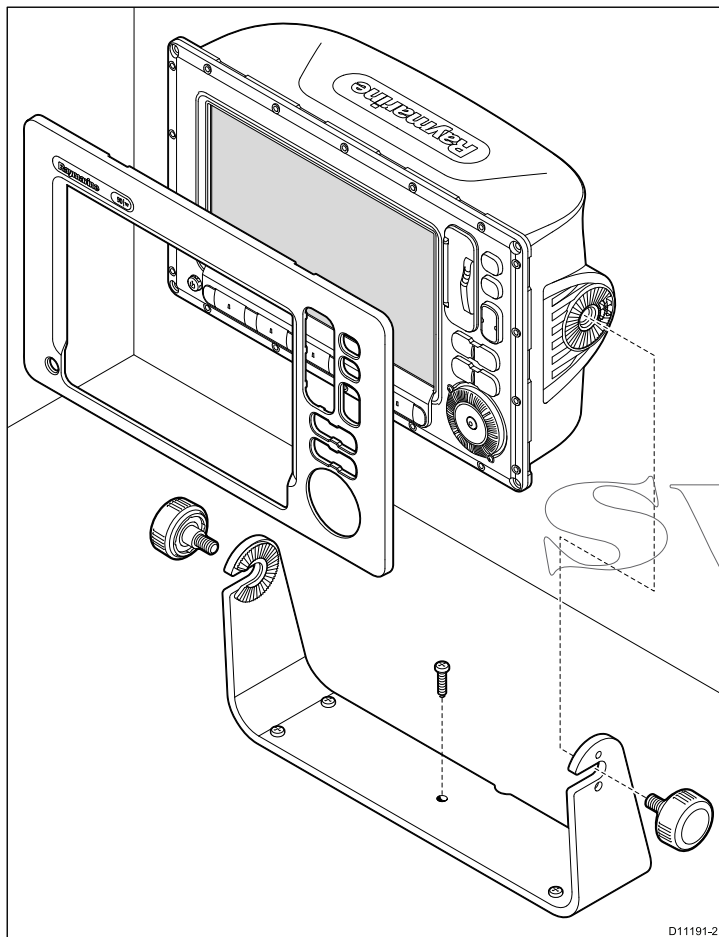
The display can be mounted on an optional bracket.

REQUIRES THE OPTIONAL MOUNTING BRACKET ACCESSORY.

Before mounting the unit ensure that you have:

- Selected a suitable location
- Identified the cable connections and route that the cables will take
- Attached the front bezel





D11191-2

Note: Bracket (trunion) mounting kit is available as an optional accessory.

1. Mark the location of the mounting bracket screw holes on the chosen mounting surface.
 2. Drill pilot holes for the screws using a suitable drill, taking care that there are no cables or anything that may be damaged behind the surface.
 3. Use the screws supplied to attach the mounting bracket securely.
 4. Attach the display unit to the mounting bracket.
- Once you have secured the display in place, proceed and make the required cable connections.

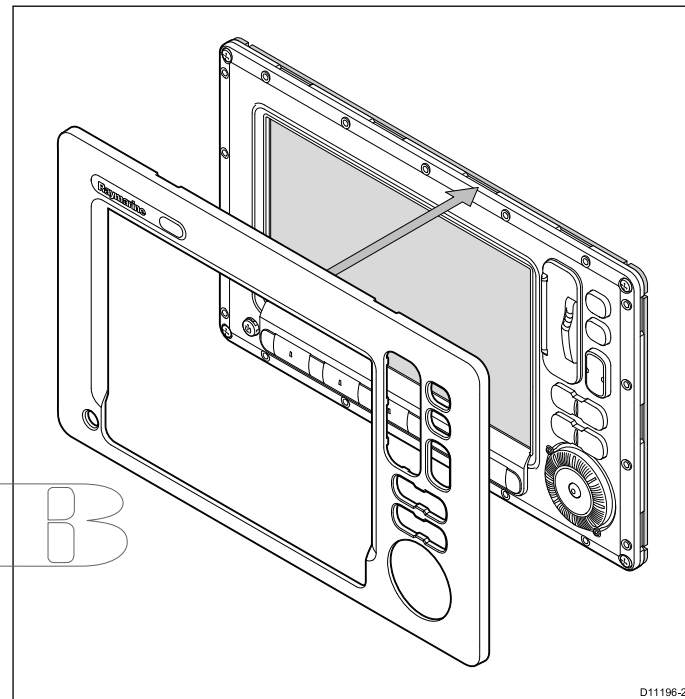
4.4 Front bezel

Attaching the front bezel

Before fitting the bezel you must have mounted the unit in its required location.

1. Carefully lift one edge of the screen protection film, so that it is accessible for removing when unit installation is complete.
2. Place the bezel over the front of the display, ensuring that the clips along the bottom edge of the bezel are latched into position.

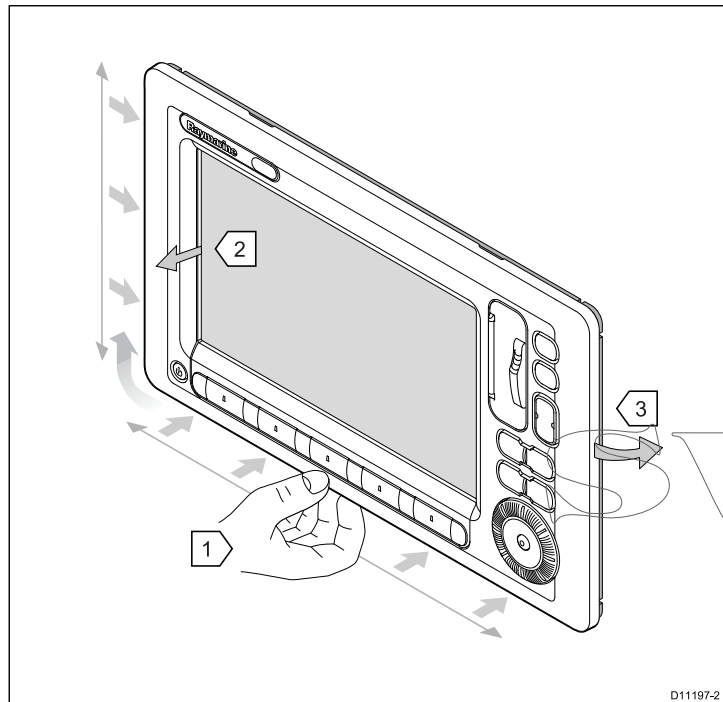
SVB



D11196-2

3. Ensure that the control buttons pass through their respective openings.
4. Apply firm but even pressure to the bezel along the:
 - i. Outer edges - work from the sides upwards and then along the top edge, to ensure that it clips securely into position.
 - ii. Inner edges - particularly along the chart card door edge, to ensure that the bezel sits flat.
5. Check that all control buttons are free to operate. Use your thumb or forefinger in a circular motion to do this.

Removing the front bezel



3. Unclip the right hand edge.

The bezel should now come away from the display easily.

Important: Use care when removing the bezel. Do not use any tools to lever the bezel, doing so may cause damage.

1. Unclip the lower edge of the bezel. Starting at the lower-center edge and working towards the outer edges,
2. Unclip the left hand edge working from the bottom corner upwards.

Chapter 5: System checks

Chapter contents

- 5.1 Initial power on test on page 54
- 5.2 Designating the data master on page 55
- 5.3 GPS check on page 55
- 5.4 Radar check on page 56
- 5.5 Sonar check on page 58
- 5.6 Language selection on page 59
- 5.7 Setting up Autopilot, AIS and Navtex on page 59
- 5.8 System setup menu on page 60



5.1 Initial power on test

Touchscreen overview

The touchscreen provides a quick way of performing many common functions.

Some of the functions you can operate with the touchscreen include:

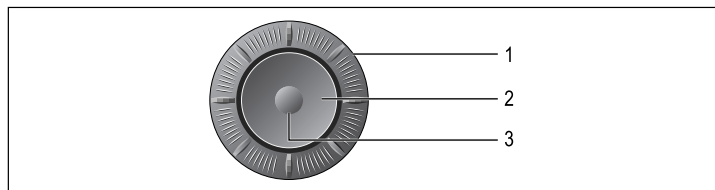
- Accessing applications.
- Adding and editing applications pages.
- Placing and editing waypoints.
- Building routes and auto-routes.
- Panning the chart display.
- Placing and moving the cursor.
- Placing and moving VRMs and EBLs.

Note: Raymarine strongly recommends that you familiarize yourself with touch operations while your vessel is anchored or moored. You may find it helpful to use the simulator mode (accessible from **Menu > System Setup Menu**) in these situations.

Note: To disable the audible “beep” that you hear when you touch the screen, go to **Menu > Display Setup > Touch beep**.

UniControl

The UniControl provides a number of key functions in a single control.



1. **Rotary Control.** Use this to select menu options and adjust the value of various items.
2. **Trackpad.** Use this to select menu items, options and move the cursor.
3. **OK button.** Use this to confirm a selection or entry.

Powering the display on

1. Press and hold the **POWER** button until the Raymarine logo appears.
2. Press **OK** to acknowledge the warning window.

5.2 Designating the data master

The following task must be performed on the multifunction display that you want to designate as the data master:

1. Press the **MENU** button.
2. Select the System Setup menu item.
3. Select the System Integration menu item.
4. Select the Data Master > ON option.
5. Press the **OK** button.

5.3 GPS check

Checking GPS operation

You can check that the GPS is functioning correctly using the chart application.

1. Select the Chart page.



2. Check the screen.

With the chart displayed, you should see:

Your boat position (indicates a GPS fix). Your current position is represented by a boat symbol or solid circle. Your position is also displayed in the data bar under VES POS.

Note: A solid circle on the chart indicates that neither heading nor Course Over Ground (COG) data is available.

5.4 Radar check



Warning: Radar scanner safety

Before rotating the radar scanner, ensure all personnel are clear.



Warning: Radar transmission safety

The radar scanner transmits electromagnetic energy. Ensure all personnel are clear of the scanner when the radar is transmitting.

Checking the radar

1. Select a Radar page.

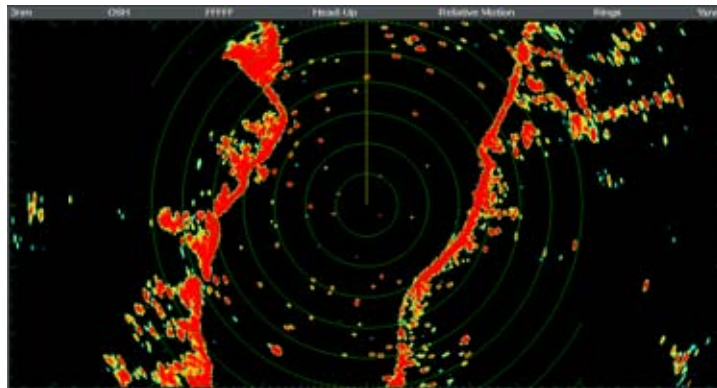
The Radar scanners will now initialize in standby mode, this process will take approximately 70 seconds.

2. Press the **POWER** button.
3. Press the **Radar Tx/Stdb** softkey and set to Tx.

The scanners should now be transmitting and receiving.

4. Check that the radar screen is operating correctly.

Typical HD digital radar screen



Note: The example above is representative of the enhanced output provided by a HD digital radar scanner.

Points to check:

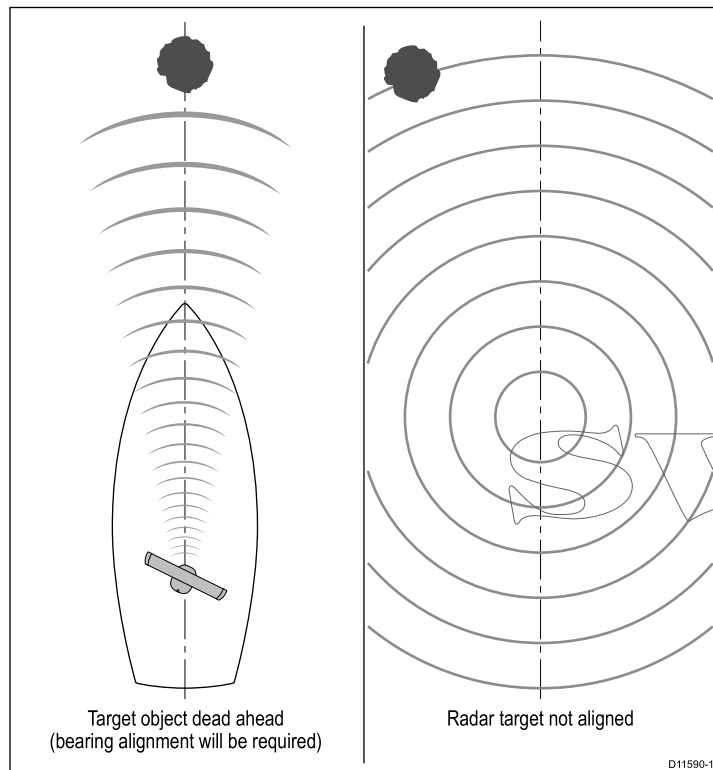
- Radar sweep with echo responses are shown on screen.
- Radar status icon rotating in top right hand corner.

Check and adjust bearing alignment

Bearing alignment

The radar bearing alignment ensures that radar objects appear at the correct bearing relative to your boat's bow. You should check the bearing alignment for any new installation.

Example misaligned radar



Checking the bearing alignment

1. With your vessel under way: Align the bow with a stationary object identified on the radar display. An object between 1 & 2 NM distant is ideal.

2. Note the position of the object on the radar display. If the target is not under the ship's heading marker (SHM), there is an alignment error and you will need to carry out bearing alignment adjustment.

Adjusting the bearing alignment

Once you have checked the bearing alignment you can proceed and make any required adjustments.

With the radar page displayed:

1. Select the **RADAR SETUP > BEARING ALIGNMENT** menu.
2. Press the **BEARING ALIGNMENT** softkey.
3. Use the rotary control to place the selected target under the Ship's Heading Marker.
4. Press **OK** when complete.

Adjusting radar offset (parking)

This setting is applicable to open array scanners. It is used to ensure the scanner parks in the correct position when rotation stops.

Before you proceed, ensure that:

- The radar page is selected
- The radar scanner is initialized standby mode

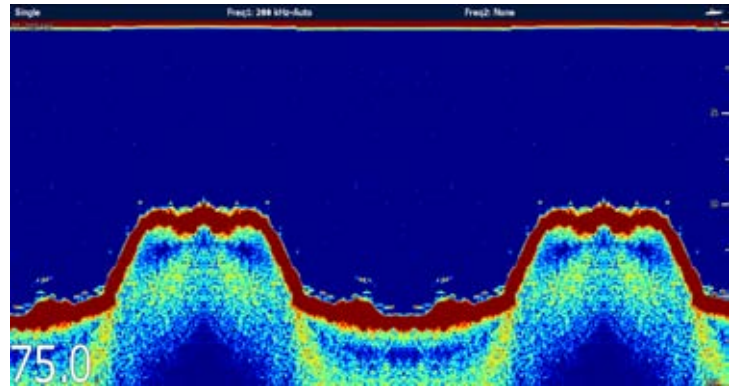
1. Press the **RADAR SETUP > SCANNER SETUP**.
2. Select the **PARKING OFFSET** option, then adjust the offset angle required to park the radar so that the antenna comes to rest facing forward (you should see the Raymarine logo wording from the front of the vessel) when you place it in either standby or switch it off.
3. Press **OK** when complete.

5.5 Sonar check



Warning: Sonar operation

- NEVER operate the sounder with the boat out of the water.
- NEVER touch the transducer face when the sounder is powered on.
- SWITCH OFF the sounder if divers are likely to be within 25 ft (5 m) of the transducer.



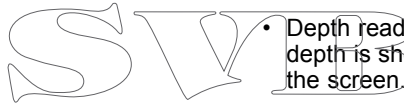
Select the fishfinder transducer

You must set up the system for the transducer connected to your DSM. Use the fishfinder setup menus to select the appropriate transducer.

Selecting the fishfinder transducer

From the main fishfinder screen:

1. Press the **MENU** button.
2. Select **Fishfinder Setup** from the list of options.
3. Select **Transducer Settings** from the list of menu options:
4. Use the **Select Transducer** option and select the appropriate transducer from those available.



2. Check the fishfinder display.

With the fishfinder active you should see:

- Depth reading (indicates the transducer is working). The depth is shown in large white numbers at the bottom left of the screen

Checking the sonar

Sonar checks are made using the fishfinder application.

1. Select the fishfinder page.

5.6 Language selection

The system can operate in the following languages:

English (US)	English (UK)	Chinese
Danish	Dutch	Finnish
French	German	Greek
Italian	Japanese	Korean
Norwegian	Portuguese	Russian
Spanish	Swedish	Turkish

1. Press the **MENU** button to open the setup menu.
2. Select the **System Setup > Language** menu.
3. Select from the languages available.

5.7 Setting up Autopilot, AIS and Navtex

Some setting up is required to enable integration of Autopilot, AIS and Navtex equipment connected as part of your system.

1. Check the system integration settings.
 - i. Access the **Menu > System Setup > System Integration** menu
 - ii. Autopilot control. This option should be Enabled if you wish to control a compatible autopilot using the display.
 - iii. NMEA port settings. These should be set appropriately for the connected devices.
 - iv. Bridge NMEA heading. This should be set ON only if the display is used as a source of heading data for other devices connected on SeaTalk or SeaTalk^{ng}.
2. Check the display presentation settings.

The AIS presentation layer must be turned ON in order to display targets.

- i. Select the **2D Chart Layers** from the chart window
- ii. Select **AIS Targets** On or Off as appropriate.


Further changes to the system set up can be made as required, however most other equipment will operate to a default level without further configuration.

5.8 System setup menu

The following table describes the various options in the System Setup menu for your multifunction display.


Menu item	Description	Options
Position Mode	Determines how positioning data is displayed — as Latitude/Longitude coordinates, or Loran TDs.	<ul style="list-style-type: none"> • Lat/Long (default) • TDs
TD Setup	When the Position Mode (see above) is set to TDs, you can specify the chain identifier, slave, and ASF values.	Chain <ul style="list-style-type: none"> • Various options, depending on cartography. Slave 1/2 <ul style="list-style-type: none"> • Various options, depending on cartography. ASF 1/2 <ul style="list-style-type: none"> • -09.9 to +09.9
Simulator	Enables or disables simulator mode, which allows you to practice operating your multifunction display without data from a GPS antenna, fishfinder (DSM sonar), or any other external unit.	<ul style="list-style-type: none"> • OFF (default) • ON • DEMO
Bearing Mode	Determines how all bearing and heading data is displayed in. This does not affect how the chart or radar displays are drawn.	<ul style="list-style-type: none"> • True (default) • Magnetic
MOB Data Type	Determines whether positional data or dead reckoning is displayed. Assuming that your vessel and the Man Over Board (MOB) are subject to the same tide and wind effects, the dead reckoning setting normally gives a more accurate course.	<ul style="list-style-type: none"> • Dead Reckoning (default) • Position

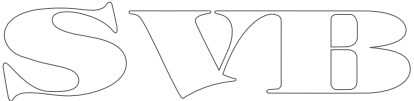
Menu item	Description	Options
Variation Source	This setting compensates for the naturally occurring offset of the earth's magnetic field. When set to Auto, the system automatically compensates, and displays the compensation value in brackets. To enter your own compensation value, use the Manual option, then specify the value using the Manual Variation setting (see below).	<ul style="list-style-type: none"> • Auto (compensation value displayed in brackets) (default) • Manual
Manual Variation	When the Variation Source menu item is set to Manual (see above), you use the Manual Variation setting to specify the compensation value that you want to use. This value is also transmitted to any other connected SeaTalk instruments.	<ul style="list-style-type: none"> • 0 degrees East (default) • Range: 0 to 30 degrees East or West •
Language	Determines the language that will be used for all on-screen text, labels, menus and options.	
Extended Character Set	Determines whether additional accented characters are made available when you are entering text.	<ul style="list-style-type: none"> • OFF (default) • ON
Ground Trip Reset	Resets the chosen ground trip distance counter to zero.	<ul style="list-style-type: none"> • Ground Trip 1 Reset • Ground Trip 2 Reset • Ground Trip 3 Reset • Ground Trip 4 Reset
Settings Reset	Resets all system setup menus, including page sets and the databar, to the factory default settings. Waypoints, routes and tracks are NOT deleted.	Reset Defaults confirmation <ul style="list-style-type: none"> • YES • NO

Menu item	Description	Options
Settings and Data Reset	<p>Resets all system setup menus, including page sets and the databar, to the factory default settings. Waypoints, routes and tracks ARE deleted.</p> <div data-bbox="448 183 1010 333" style="border: 1px solid black; padding: 5px;"> <p>Note: For systems using multiple multifunction displays (networked displays), the complete system database is deleted on the data master (primary display). Only the waypoints, routes and tracks will be deleted from any additional multifunction displays.</p> </div>	<p>Factory Reset confirmation</p> <ul style="list-style-type: none"> • YES • NO
Date/Time Setup	<p>These options enable you to customize the date and time format to your requirements. You can also specify a local time offset from Universal Time Constant (UTC), to compensate for any time zone difference.</p> <div data-bbox="576 505 991 605" style="text-align: center;">  </div>	<p>Date Format</p> <ul style="list-style-type: none"> • mm/dd/yy • dd/mm/yy <p>Time Format</p> <ul style="list-style-type: none"> • 12hr • 24hr <p>Local Time Offset</p> <ul style="list-style-type: none"> • -013.0 to +013.0

Menu item	Description	Options
Units Setup	<p>Enables you to specify the units used for the following key measurements:</p> <ul style="list-style-type: none"> • Distance • Speed • Depth • Temperature • Pressure • Volume <div data-bbox="483 415 1048 538"> <p>Note: If the Distance unit is set to Nautical Miles or Statute Miles, and the data displayed is less than 1 unit, the system displays the units in Feet. If the Distance unit is set to Kilometers, the system displays the units in Meters.</p> </div>	<p>Distance Units</p> <ul style="list-style-type: none"> • Nautical Miles (default) • Statute Miles • Kilometers <p>Speed Units</p> <ul style="list-style-type: none"> • Knots (default) • mph (miles per hour) • kph (kilometers per hour) <p>Depth Units</p> <ul style="list-style-type: none"> • Meters • Feet (default) • Fathoms <p>Temperature Units</p> <ul style="list-style-type: none"> • Fahrenheit (default) • Celsius <p>Pressure Units</p> <ul style="list-style-type: none"> • Bar • PSI (default) • Kilopascals <p>Volume Units</p> <ul style="list-style-type: none"> • US Gallons • Imp (Imperial) Gallons (default)

Menu item	Description	Options
		<ul style="list-style-type: none"> • Liters
System Integration	<p>Determines the connection settings for external equipment. The following items are available in the sub-menu:</p> <ul style="list-style-type: none"> • Autopilot Control — If set to Enabled, this option allows you to control certain aspects of a connected pilot control head, such as sending commands to engage and disengage the autopilot. If set to Disabled, you will not be able to control the autopilot from your multifunction display, and all functions must be controlled from the pilot control head itself. • DSC Message — If set to ON, details of distress DSC messages from a connected DSC VHF radio will be displayed on your multifunction display. If set to OFF, the messages will NOT be displayed on your multifunction display. • SeaTalk Alarms — If set to ON, all system alarms generated by any connected SeaTalk units will be displayed on your multifunction display. If set to OFF, the alarms will NOT be displayed on your multifunction display. • Preferred GPS Source — Your multifunction display supports GPS receivers connected by SeaTalk1, SeaTalk^{ng}, or NMEA2000. Select the preferred source. • Data Master — If you have more than one multifunction display on the same network, one of them must be set as the data master. When this option is set to ON, the multifunction display you are currently using will be set as the data master. • Bridge NMEA Heading — If set to ON, NMEA heading data will be bridged onto the SeaTalk data bus, and will be sent to all NMEA-connected devices. If set to OFF, NMEA heading data will NOT be bridged onto the SeaTalk bus. An example of a use for this setting is when using MARPA with an external fast heading sensor, in which case you should set this option 	<p>Autopilot Control</p> <ul style="list-style-type: none"> • Disabled (default) • Enabled <p>DSC Message</p> <ul style="list-style-type: none"> • OFF (default) • ON <p>SeaTalk Alarms</p> <ul style="list-style-type: none"> • ON (default) • OFF <p>Preferred GPS Source</p> <ul style="list-style-type: none"> • SeaTalkng / NMEA2000 (default) • SeaTalk1 • NMEA0183 <p>Data Master</p> <ul style="list-style-type: none"> • ON (default) • OFF <p>Bridge NMEA Heading</p> <ul style="list-style-type: none"> • OFF (default) • ON <p>SeaTalk2 Keyboard</p>

Menu item	Description	Options
	<p>to OFF to ensure that all NMEA-connected units receive heading data from the external heading sensor.</p> <ul style="list-style-type: none"> • SeaTalk2 Keyboard — Set to ONE or ALL if you have a SeaTalk2 keyboard connected. Otherwise, set to OFF. • NMEA Output Setup — allows you to enable or disable the individual NMEA output “sentences” for each NMEA port. • NMEA Port Setting — Allows you to specify the appropriate port speed for the equipment connected to each NMEA port. When the Navtex 4800 or Navtex 9600 option is selected, you will be able to view the Navtex message list. Use the AIS 38400 option for AIS receivers. 	<ul style="list-style-type: none"> • OFF (default) • ALL • ONE <p>NMEA Output Setup</p> <ul style="list-style-type: none"> • APB • BWC • BWR • DBT • DPT • GGA • GLL • MTW • MWV • RMA • RMB • RMC • RSD • RTE • TTM • VHW • VLW • WPL

Menu item	Description	Options
		<ul style="list-style-type: none"> • VTG • ZDA NMEA Port Setting <ul style="list-style-type: none"> • NMEA 4800 (default) • Navtex 4800 • Navtex 9600 • AIS 38400
Waypoint Password Setup	<p>This menu allows you to enable password protection for waypoints, and to change the password.</p> 	Enable Password <ul style="list-style-type: none"> • OFF (default) • ON Change Password <ul style="list-style-type: none"> • Displays Edit Waypoint Password dialog.

Chapter 6: Troubleshooting

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- 6.1 Troubleshooting on page 68
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- 6.3 Radar troubleshooting on page 70
- 6.4 GPS troubleshooting on page 71
- 6.5 Sonar troubleshooting on page 72
- 6.6 System data troubleshooting on page 73
- 6.7 Video troubleshooting on page 74
- 6.8 Touchscreen troubleshooting on page 75
- 6.9 SeaTalk^{hs} LED indications on page 75
- 6.10 Miscellaneous troubleshooting on page 76

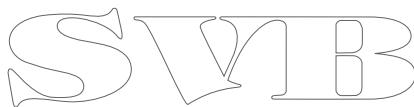


6.1 Troubleshooting

The troubleshooting information provides possible causes and corrective action required for common problems associated with marine electronics installations.

All Raymarine products are, prior to packing and shipping, subjected to comprehensive test and quality assurance programs. However, if you experience problems with the operation of your E-Series Widescreen multifunction display, this section will help you to diagnose and correct problems in order to restore normal operation.

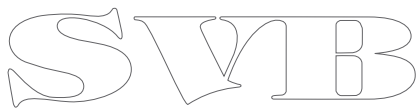
If after referring to this section you are still having problems with your unit, please contact Raymarine Technical Support for further advice.



6.2 Power up troubleshooting

Problems at power up and their possible causes and solutions are described here.

Problem	Possible causes	Possible solutions
The display does not start up.	Problem with power to the unit.	Check relevant fuses and breakers.
		Check that the power supply cable is sound and that all connections are tight and free from corrosion.
		Check that the power source is of the correct voltage and sufficient current.



6.3 Radar troubleshooting

Problems with the radar and their possible causes and solutions are described here.

Problem	Possible causes	Possible solutions
No Data or No scanner message	Radar scanner power supply	Check that the scanner power supply cable is sound and that all connections are tight and free from corrosion.
		Check relevant fuses and breakers.
		Check power source is of the correct voltage and sufficient current (using voltage booster if appropriate).
	SeaTalk ^h s network problem	Check that the Scanner is correctly connected to the display via a crossover coupler or SeaTalk ^h s switch.
		Check the status of the SeaTalk ^h s Switch.
		Check that SeaTalk ^h s cables are free from damage.
	Software mismatch between equipment may prevent communication.	Contact Raymarine technical support.
	Switch at scanner pedestal in OFF position	Ensure scanner pedestal switch is in ON position.
Radar will not initialize (Voltage control module (VCM) stuck in "sleep mode")	Intermittent or poor power connection	Check power connection at VCM. (Voltage at input = 12 / 24 V, Voltage at output = 40 V)
The bearing of a target on the radar screen is incorrect.	The radar bearing alignment requires correcting.	Check and adjust radar bearing alignment.

6.4 GPS troubleshooting

Problems with the GPS and their possible causes and solutions are described here.

Problem	Possible causes	Possible solutions
"No Fix" GPS status icon is displayed.	Geographic location or prevailing conditions preventing satellite fix.	Check periodically to see if a fix is obtained in better conditions or another geographic location.
	External GPS connection fault.	Ensure that GPS connections and cabling are correct and fault free..
	External GPS antenna in poor position. For example: <ul style="list-style-type: none">• Below decks• Close proximity to transmitting equipment such as VHF radio	Ensure GPS antenna has a clear view of the sky.
	GPS installation problem.	Refer to manufacturers handbook for installation details.
Note: A GPS Status screen is available within the Setup menu. This provides satellite signal strength and other relevant information.		

6.5 Sonar troubleshooting

Problems with the sonar and their possible causes and solutions are described here.

Problem	Possible causes	Possible solutions
No data source for the fishfinder.	DSM power supply fault.	Check the DSM power supply and cables.
	Other DSM fault.	Refer to the instructions supplied with the DSM unit.
	SeaTalk ^{hs} network problem.	Check that the DSM is correctly connected to the display or SeaTalk ^{hs} switch.
		Check the status of the SeaTalk ^{hs} Switch.
		Check that SeaTalk ^{hs} cables are free from damage.
	Software mismatch between equipment may prevent communication.	Contact Raymarine technical support.
Problematic depth readings or sonar image.	Gain or Frequency settings may be inappropriate for present conditions.	Check the fishfinder presets, gain and frequency settings.
	DSM cable fault.	Ensure that the power, transducer and all other cables to the DSM unit are properly connected and free from damage.
	Other DSM fault.	Refer to the instructions supplied with the DSM unit.

6.6 System data troubleshooting

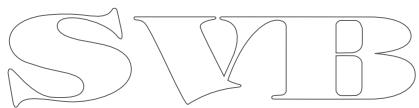
Aspects of the installation can cause problems with the data shared between connected equipment. Such problems, their possible causes and solutions are described here.

Problem	Possible causes	Possible solutions
Instrument, engine or other system data is unavailable at all displays.	Data is not being received at the display.	Check the data bus (e.g. SeaTalk ^{ng}) wiring and connection to the display.
		Check the overall integrity of the data bus (e.g. SeaTalk ^{ng}) wiring.
		If available refer to the reference guide for the data bus. (e.g. SeaTalk ^{ng} reference manual)
	Data source (e.g ST70 instrument or engine interface) is not operating.	Check the source of the missing data (e.g. ST70 instrument or engine interface).
		Check the power to the SeaTalk bus.
		Refer to the manufacturer's handbook for the equipment in question.
	Software mismatch between equipment may prevent communication.	Contact Raymarine technical support.
Instrument or other system data is missing from some but not all displays.	SeaTalk ^{hs} network problem	Check that all required equipment is connected to the SeaTalk ^{hs} switch.
		Check the status of the SeaTalk ^{hs} Switch.
		Check that SeaTalk ^{hs} cables are free from damage.
	Software mismatch between equipment may prevent communication.	Contact Raymarine technical support

6.7 Video troubleshooting

Problems with the video inputs and their possible causes and solutions are described here.

Problem	Possible causes	Possible solutions
No signal message on screen (video image not displayed)	Cable or connection fault	Check that the connections are sound and free from corrosion.
Only 1 video connection available	Video inputs 2, 3 and 4 are on a separate audio / video cable	Ensure that you have the separate audio/video cable and that it is correctly connected.



6.8 Touchscreen troubleshooting

Problems with the touchscreen and their possible causes and solutions are described here.

Problem	Possible causes	Possible solutions
Touchscreen does not operate as expected	Touch lock is enabled	Use the Trackpad to turn off the touch lock on the home screen.
	Screen is not being operated with bare fingers, for example gloves are being worn	Bare fingers must make contact with the screen for correct operation. Alternatively you may use conductive gloves.
	Touchscreen requires calibration	Use the setup menus to calibrate the touchscreen.
	Saltwater deposits on the screen	Carefully clean and dry the screen in accordance with the instructions provided.

6.9 SeaTalk^{hs} LED indications

LED indications associated with the SeaTalk^{hs} switch are described here.



LED state	Possible causes
For all connected channels: 1 steady and 1 flashing green LED.	No problem detected (Steady LED indicates network connection Flashing LED indicates network traffic) .
No LEDs are illuminated.	No power to the SeaTalk ^{hs} switch.
Some LEDs are not illuminated.	<ul style="list-style-type: none">• Cable / connection faults on the channels with non-illuminated LEDs.• Equipment connected to non-illuminated LEDs may be faulty.

6.10 Miscellaneous troubleshooting

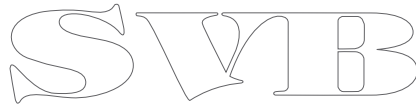
Miscellaneous problems and their possible causes and solutions are described here.

Problem	Possible causes	Possible solutions
Display behaves erratically: <ul style="list-style-type: none"> • Frequent unexpected resets. • System crashes or other erratic behavior. 	Intermittent problem with power to the display.	Check relevant fuses and breakers.
		Check that the power supply cable is sound and that all connections are tight and free from corrosion.
		Check that the power source is of the correct voltage and sufficient current.
	Buttons trapped by front bezel.	Ensure that the front bezel is fitted correctly and that all buttons are free to operate correctly.
	Software mismatch on system (upgrade required).	Go to www.raymarine.com and click on support for the latest software downloads.
Corrupt data / other unknown issue.		Perform a factory reset. This option can be found within Menu > System Setup > Settings and Data Reset .
		<div> Important: This will result in the loss of any settings and data (such as waypoints) stored on the display. Please save any important data to a CF card before resetting. </div>

Chapter 7: Technical support

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- [7.1 Raymarine technical support on page 78](#)
- [7.2 3rd party support on page 79](#)



7.1 Raymarine technical support

Raymarine provides a comprehensive customer support service, on the world wide web, through our worldwide dealer network and by telephone help line. If you are unable to resolve a problem, please use any of these facilities to obtain additional help.

Web support

Please visit the customer support area of our website at:

www.raymarine.com

This contains Frequently Asked Questions, servicing information, e-mail access to the Raymarine Technical Support Department and details of worldwide Raymarine agents.

Telephone support

In the USA call:

+1 603 881 5200 extension 2444

In the UK, Europe, the Middle East, or Far East call:

+44 (0)23 9271 4713



Product information

If you need to request service, please have the following information to hand:

- Product name.
- Product identity.
- Serial number.
- Software application version.

You can obtain this product information using the menus within your product.

Viewing product information

1. Open the system Setup menu.
2. Select System Diagnostics.
3. Select Software Services.
4. Select the Software Services menu:

7.2 3rd party support

Contact and support details for 3rd party suppliers can be found on the appropriate websites.

Jeppesen

www.jeppesen.com

Navionics

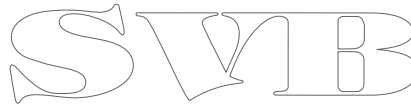
www.navionics.com

Sirius marine weather

www.sirius.com/marineweather

Sirius audio

www.sirius.com

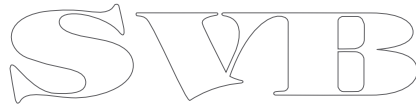


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Chapter 8: Technical specification

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8.1 Technical specification

Nominal supply voltage	12 or 24 V dc
Operating voltage range	10.7 to 32 V dc
Fuse / Breakers	In-line fuse (fitted within power cable) <ul style="list-style-type: none"> • 7 A. (Standard 20 mm glass fuse)
Current	4 A peak operating current
Power consumption	Typical power consumption at full brightness: <ul style="list-style-type: none"> • E90W: 23 W • E120W: 35 W • E140W: 37 W
LEN (Refer to Seataalk [®] reference manual for further information.	1

Environmental	Installation environment <ul style="list-style-type: none"> • Operating temperature: -10 °C to +50 °C (14 °F to 122 °F) • Storage temperature: -20 °C to +65 °C (-4 °F to 149 °F) • Relative humidity: max 95% • Water proof to IPX6
Weight	<ul style="list-style-type: none"> • E90W: 3.7 kg (8.2 lb) • E120W: 4.4 kg (9.7 lb) • E140W: 5.4 kg (11.9 lb)
Display screen	TFT LCD display, 24bit color (16.7 M colors) Resolution <ul style="list-style-type: none"> • E90W: 9 in display, 800 x 480 pixels • E120W: 12 in display, 1280 x 800 pixels • E140W: 14 in display, 1280 x 800 pixels Brightness <ul style="list-style-type: none"> • E90W: 800 cd/m² • E120W / E140W: 1000 cd/m²

Data connections.	<ul style="list-style-type: none"> • 3 x NMEA 0183 ports: <ul style="list-style-type: none"> – NMEA port 1: I/O 4800/9600 baud – NMEA port 2: I/O 4800/9600/38400 baud – NMEA port 3: Input only, 4800 baud • 1 x SeaTalk port • 1 x SeaTalk^{hs}port. 100 Mbits/s. RJ45 type connection • 1 x SeaTalk^{ng} connection
Audio alarm output	<ul style="list-style-type: none"> • 1 x Alarm output. Provides supply battery voltage @100 mA peak load. • 1x Alarm repeat. Line level output, 1V rms line level into 600R load.
Video input	4 x NTSC/PAL video inputs to ITU-R BT.601 standard.
Video output	1 x VGA output at either 720p (1280 x 720) or native display resolution.

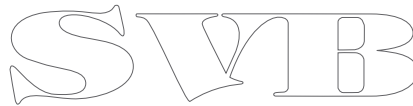
Electronic charts	<p>Embedded electronic charts</p> <ul style="list-style-type: none"> • Jeppesen (embedded cartography appropriate to purchase region; North America, Europe or Rest of World, as appropriate) <p>Compatible chart cards (CompactFlash)</p> <ul style="list-style-type: none"> • Jeppesen C-MAP 4D • Navionics Silver, Gold, Gold+, Platinum and Platinum+
Conformance	<ul style="list-style-type: none"> • Europe: 2004/108/EC • Australia and New Zealand: C-Tick, Compliance Level 2

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Chapter 9: Options and accessories

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- [9.2 SeaTalk^{ng} accessories on page 86](#)
- [9.3 SeaTalk^{hs} accessories on page 87](#)
- [9.4 Spares and accessories on page 89](#)



9.1 SeaTalk accessories

SeaTalk cables and accessories for use with compatible products.

Description	Part No	Notes
NMEA / SeaTalk converter	E85001	
3 m (9.8 ft) SeaTalk extension cable	D285	
5 m (16.4 ft) SeaTalk extension cable	D286	
9 m (29.5 ft) SeaTalk extension cable	D287	
12 m (39.4 ft) SeaTalk extension cable	E25051	
20 m (65.6 ft) SeaTalk extension cable	D288	

9.2 SeaTalk^{ng} accessories

SeaTalk^{ng} cables and accessories for use with compatible products.

Description	Part No	Notes
Backbone Kit	A25062	Includes: <ul style="list-style-type: none"> • 2 x 5 m (16.4 ft) Backbone cable • 1 x 20 m (65.6 ft) Backbone cable • 4 x T-piece • 2 x Backbone terminator • 1 x Power cable
SeaTalk ^{ng} 0.4 m (1.3 ft) spur	A06038	
SeaTalk ^{ng} 1 m (3.3 ft) spur	A06039	
SeaTalk ^{ng} 3 m (9.8 ft) spur	A06040	
SeaTalk ^{ng} 5 m (16.4 ft) spur	A06041	
SeaTalk ^{ng} 0.4 m (1.3 ft) backbone	A06033	
SeaTalk ^{ng} 1 m (3.3 ft) backbone	A06034	

Description	Part No	Notes
SeaTalk ^{ng} 3 m (9.8 ft) backbone	A06035	
SeaTalk ^{ng} 5 m (16.4 ft) backbone	A06036	
SeaTalk ^{ng} 20 m (65.6 ft) backbone	A06037	
SeaTalk ^{ng} - bare ends 1 m (3.3 ft) spur	A06043	
SeaTalk ^{ng} - bare ends 3 m (9.8 ft) spur	A06044	
SeaTalk ^{ng} — SeaTalk2 0.4 m (1.3 ft) spur	A06048	
SeaTalk ^{ng} Power cable	A06049	
SeaTalk ^{ng} Terminator	A06031	
SeaTalk ^{ng} T-Piece	A06028	
SeaTalk ^{ng} E-Piece	A06064	
SeaTalk ^{ng} Blanking plug	A06032	

9.3 SeaTalk^{hs} accessories

Digital radar scanner cables

Scanner cables

Connect the Radar scanner to either the SeaTalk^{hs} switch or the crossover coupler.

Cable	Part number	Notes
5 m (16.4 ft) Digital cable	A55076	
10 m (32.8 ft) Digital cable	A55077	Your radar scanner may include the 10 m cable (depending upon the model purchased)
15 m (49.2 ft) Digital cable	A55078	
25 m (82.0 ft) Digital cable	A55079	

Scanner extension cables

Use of one of these cables to extend the connection between the radar scanner and the SeaTalk^{hs} switch or crossover coupler.

Cable	Part number	Notes
2.5 m (8.2 ft) extension cable	A92141	
5 m (16.4 ft) extension cable	A55080	
10 m (32.8 ft) extension cable	A55081	

SeaTalk^{hs} network cables

SeaTalk^{hs} network cables

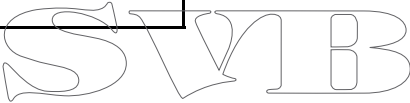
Standard network cables connect compatible equipment to the SeaTalk^{hs} switch (or crossover coupler), they have a waterproof connector at one end.

Cable	Part number	Notes
1.5 m (4.9 ft) SeaTalk ^{hs} network cable	E55049	
5 m (16.4 ft) SeaTalk ^{hs} network cable	E55050	
10 m (32.8 ft) SeaTalk ^{hs} network cable	E55051	
20 m (65.6 ft) SeaTalk ^{hs} network cable	E55052	

Fully waterproof SeaTalk^{hs} network cables

Connect directly from display to display.

Cable	Part number	Notes
1.5 m (4.9 ft) Dual end SeaTalk ^{hs} network cable.	A62245	Cable has waterproof connectors at both ends.
15 m (49.2 ft) Dual end SeaTalk ^{hs} network cable	A62246	Cable has waterproof connectors at both ends.



SeaTalk^{hs} hardware

Cable	Part number	Notes
SeaTalk ^{hs} switch	E55058	8 way hub for network connection of multiple SeaTalk ^{hs} devices.
SeaTalk ^{hs} coupler	E55060	Couple for connection of a single SeaTalk ^{hs} device.

9.4 Spares and accessories

Options and accessories for the E-Series Widescreen Multifunction displays.

Optional accessories

Description	Part No	Notes
Trunnion (bracket) mount kit (C90W / E90W)	A62132	
Trunnion (bracket) mount kit (C120W / E120W)	A62133	

Description	Part No	Notes
Trunnion (bracket) mount kit (C140W / E140W)	A62134	
5 m (16.4 ft) Audio/Video cable	A62158	<p>Available as an accessory. This cable provides:</p> <ul style="list-style-type: none">• 3 x video input BNC connectors• 1 x VGA video output connector• 1 x RCA phono jack plug (for alarm signalling only) <div>Note: 5 m (16.4 ft) length is for the VGA flying lead only. All other connectors are on leads of 0.5 m (1.6 ft) length.</div>

Spare / replacement parts

Description	Part No	Notes
Trunnion knob	R08001	
Suncover (C90W / E90W)	R62122	

Description	Part No	Notes
Suncover (C120W / E90W)	R62123	
Suncover (C140W / E90W)	R62124	
Flushmount Gasket (C and E-Widescreen — all models)	R62128	
Flushmount Screw Kit (C and E-Widescreen — all models)	R62312	
Bezel (E90W)	R62151	
Bezel (E120W)	R62152	
Bezel (E140W)	R62153	
1.5 m (4.9 ft) Power and data cable — straight	R62131	
1.5 m (4.9 ft) Power and data cable — 90 degree	R62227	

Service spares

Service spares are available to service dealers only.

Description	Part No	Notes
Chart door	R62184	
Seal Set (C90W / E90W)	R62186	

Description	Part No	Notes
Seal Set (C120W / E120W)	R62187	
Seal Set (C140W / E140W)	R62188	
Front panel (C90W / E90W)	R62191	
Front panel (C120W / E120W)	R62192	
Front panel (C140W / E140W)	R62193	
Chartreader assembly	R62209	
Lower keyboard assy (C90W / E90W)	R62211	
Lower keyboard assy (C120W / E120W)	R62212	
Lower keyboard assy (C140W / E140W)	R62213	
Side keyboard assy	R62214	
E90W Bonded Touchscreen Assembly	R62249	
E120W Bonded Touchscreen Assembly	R62250	
E140W Bonded Touchscreen Assembly	R62251	

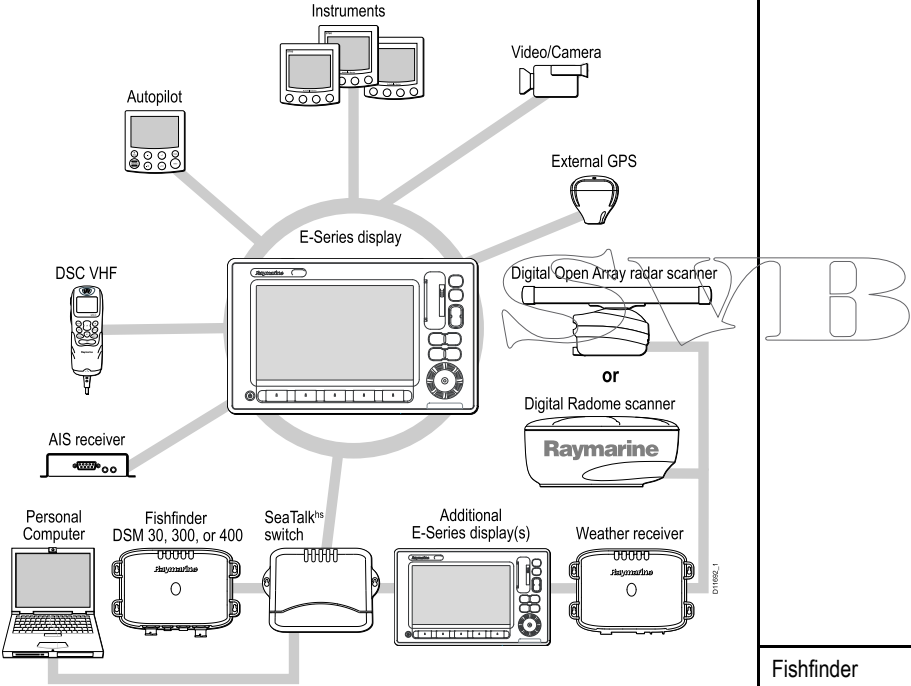
Description	Part No	Notes
Rotary encoder PCB assembly	R62252	
I/O PCB Assembly	R62253	
CPU PCB Assembly	R62254	
Keymat Set	R62270	
SSD PCB Assembly — US version	R62255	
SSD PCB Assembly — EU version	R62298	
SSD PCB Assembly — ROW version	R62299	
UniControl	R62313	

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Appendix A Multifunction display system integration

You can connect a number of external devices to your multifunction display, providing additional features and functions.

The following diagram illustrates the various external devices that can be connected to your multifunction display:



Your multifunction display uses a number of protocols to transfer data between the various devices in your networked system. The following table details which devices may be connected to your

display, and the type of connectivity (in terms of protocols and physical interfaces) that they use to exchange data with the display:

Device Type	Suitable Devices	Connectivity
Radar	<p>Up to two radar scanners may be connected to your multifunction display, but only one may be operated at any one time.</p> <ul style="list-style-type: none">• 4 kilowatt Digital Radome Scanner.• 4 kilowatt HD Digital Radome Scanner.• 4 kilowatt HD Digital Open Array Scanner.• 4 kilowatt SuperHD Digital Open Array Scanner.• 12 kilowatt SuperHD Digital Open Array Scanner. <div>Note: Please ensure your radar scanner is using the latest software version.</div>	SeaTalk ^{hs}
Fishfinder	<ul style="list-style-type: none">• ONE DSM 30, OR• ONE DSM 300, OR• ONE DSM 400	SeaTalk ^{hs}

Device Type	Suitable Devices	Connectivity
Cartography — included	Embedded (internal) Jeppesen cartography	Internal storage
Cartography — optional	External CompactFlash chart cards: <ul style="list-style-type: none"> • Jeppesen C-Map 4D • Navionics Silver • Navionics Gold • Navionics Gold+ • Navionics Platinum • Navionics Platinum+ • Navionics Fish'N Chip • Navionics Hotmaps Refer to the Raymarine website (www.raymarine.com) for the latest list of supported chart cards.	CompactFlash card slot
Sirius Weather/Audio	<ul style="list-style-type: none"> • SR100 Sirius Weather Receiver 	SeaTalk ^{hs}
Weather sensor	Airmar Weather Station	SeaTalk2, SeaTalk ^{ng} , or NMEA 2000

Device Type	Suitable Devices	Connectivity
AIS	<ul style="list-style-type: none"> • AIS 250 • AIS 500 • Third-party AIS Class A or Class B receiver / transceiver 	NMEA 0183, SeaTalk ^{ng}
Navtex	Navtex Receiver	NMEA 0183
Fast Heading Sensor	Fast Heading Sensor	NMEA 0183
GPS — external	Raystar125 GPS or third-party external GPS receiver	SeaTalk, SeaTalk ^{ng} , or NMEA 0183
Instruments	All current Raymarine instruments	SeaTalk, SeaTalk ^{ng} , or NMEA 0183
Autopilot — Raymarine	All current Raymarine autopilots	SeaTalk, SeaTalk ^{ng}
Autopilot — third party	Third-party autopilots	NMEA 0183 (waypoint and bearing information)
VHF radio	Raymarine DSC VHF radios	NMEA 0183, SeaTalk
Additional Multifunction Display(s)	E90W, E120W, E140W,	SeaTalk, SeaTalk ^{hs} , SeaTalk ^{ng}
Video/camera	Composite PAL or NTSC video source	BNC connector

Appendix B NMEA 0183 sentences

The display supports the following NMEA 0183 sentences. These are applicable to NMEA 0183 and SeaTalk protocols.

Transmit

APB	Autopilot b
BWC	Bearing and distance to waypoint
BWR	Bearing and distance to waypoint rhumb line
DBT	Depth below transducer
DPT	Depth
MTW	Water temperature
RMB	Recommended minimum navigation information
RSD	Radar system data
TTM	Tracked target message
VHW	Water speed and heading
VLW	Distance travelled through the water
GGA	Global positioning system fix data
GLL	Geographic position latitude longitude
GSA	GPS DOP and active satellites
GSV	GPS satellites in view
RMA	Recommended minimum specific loran c data

RMC	Recommended minimum specific GPS transit data
VTG	Course over ground and ground speed
ZDA	Time and date
MWV	Wind speed and angle
RTE	Routes sentence
WPL	Waypoint location sentence

Receive

AAM	Waypoint arrival alarm sentence
DBT	Depth below transducer sentence
DPT	Depth sentence
DTM	Datum reference sentence
APB	Autopilot b sentence
BWC	Bearing and distance to waypoint sentence
BWR	Bearing and distance to waypoint rhumb line sentence
DSC	Digital selective calling information sentence
DSE	Distress sentence expansion
GGA	Global positioning system fix data sentence

	Geographic position loran c sentence GLC
GLL	Geographic position latitude longitude sentence
GSA	GPS DOP and active satellites sentence
GSV	GPS satellites in view sentence
HDG	Heading deviation and variation sentence
HDT	Heading true sentence
HDM	Heading magnetic sentence
MSK	MSK receiver interface sentence
MSS	MSK receive r signal status sentence
MTW	Water temperature sentence
WMV	Wind speed and angle sentence
RMA	Recommended minimum specific loran c data sentence
RMB	Recommended minimum navigation information sentence
RMC	Recommended minimum specific GPS transit data sentence
VHW	Water speed and heading sentence
VLW	Distance travelled through the water sentence
VTG	Course over ground and ground speed sentence

XTE	Cross track error measured sentence
ZDA	Time and date sentence
MDA	Meteorological composite sentence
GBS	GPS satellite fault detection data sentence
RTE	Routes sentence
WPL	Waypoint location sentence

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Appendix C NMEA 2000 sentences

The display supports the following NMEA 2000 sentences. These are applicable to NMEA 2000, SeaTalk^{ng} and SeaTalk 2 protocols.

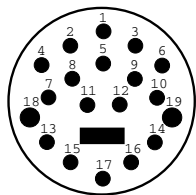
Message number	Message description	Transmit	Receive	Bridge
59392	ISO Acknowledgment	•	•	•
59904	ISO Request		•	
60928	ISO Address Claim	•	•	•
126208	NMEA - Acknowledge group function	•	•	•
126464	PGN List	•	•	•
126992	System time	•	•	•
126996	Product information	•	•	•
127237	Heading/Track Control		•	
127245	Rudder	•	•	•
127250	Vessel heading	•	•	•
127488	Engine parameters rapid update		•	
127489	Dynamic engine parameters		•	
127493	Dynamic transmission		•	
127498	Static engine parameters		•	
127505	Fluid level		•	
128259	Speed	•	•	•
128267	Water depth	•	•	•
128275	Distance log	•	•	•
129025	Position rapid update	•	•	•

Message number	Message description	Transmit	Receive	Bridge
129026	COG SOG rapid update	•	•	•
129029	GNSS position data	•	•	•
129033	Time and date	•	•	•
129038	AIS Class A Position Report		•	
129039	AIS Class B Position Report		•	
129040	AIS Class B Extended Position Report		•	
129044	Datum	•	•	•
129283	Cross track error	•	•	•
129284	Navigation data	•	•	•
129291	Set and drift rapid update	•	•	•
129301	Time to or from mark		•	
129539	NMEA 2000 GNSS DOPs message		•	
129540	GNSS Sats in view	•	•	•
129545	NMEA 2000 GNSS RAIM output message		•	
129550	GNSS differential correction receiver interface		•	
129551	GNSS differential correction receiver signal		•	
129793	AIS UTC and Date Report			•
129794	AIS Class A Static and Voyage Related Data			•
129801	AIS Addressed Safety Related Message			•
129802	AIS Safety Related Broadcast Message			•
130306	Wind data	•	•	•

Message number	Message description	Transmit	Receive	Bridge
130310	Environmental parameters	•	•	•
130311	Environmental parameters message		•	
130576	Small craft status		•	
130577	Direction data	•	•	•
130578	Vessel speed components		•	

Appendix D Connectors and pinouts

Power, data and video connector



Item	Remarks
Identification	PWR/NMEA/ST/Video
Connector type	19 pin twist-lock

Item	Remarks
Current source to network	No current sourced for external devices.
Current sink from network	<ul style="list-style-type: none"> • PSU: Main Power input. • NMEA: No power required for interface. • ST1: <50mA (Interface drive only). • Video: No power required for interface.

Power, data and video cable cores and colors

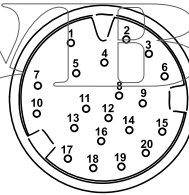
Signal	Pin	Cable	AWG	Grouping	Color
BATT+	18	32/0.2	18		Red
BATT-	19	32/0.2	18		Black
SCREEN	17	not used			

Signal	Pin	Cable	AWG	Grouping	Color
NMEA1 TX+	6	7/0.15	26	Twisted pair	Yellow
NMEA1 TX-	9	7/0.15	26		Brown
NMEA1 RX+	4	7/0.15	26	Twisted pair	White
NMEA1 RX-	8	7/0.15	26		Green
NMEA2 TX+	1	7/0.15	26	Twisted pair	Orange / Yellow
NMEA2 TX-	3	7/0.15	26		Orange / Brown
NMEA2 RX+	7	7/0.15	26	Twisted pair	Orange / White
NMEA2 RX-	11	7/0.15	26		Orange / Green
NMEA3 RX+	5	7/0.15	26	Twisted pair	Blue / White
NMEA3 RX-	2	7/0.15	26		Blue / Green
ST1 BATT+	10	7/0.15	26		White / Red
ST1 DATA	12	7/0.15	26		White / Yellow
HONK	16	7/0.15	26		Grey

Signal	Pin	Cable	AWG	Grouping	Color
ST1 BATT-	14	7/0.15	26		White / Black
VIDEO	15	RG179 75R coax (or equivalent)			
VIDEO RTN	13	Screen			

Video and alarm-audio connector

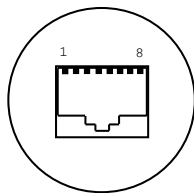
Details for the connector providing video and alarm audio connectivity.



Pin	Signal
1	VIDEO IN A
2	VIDEO IN B
3	VIDEO IN C
4	VIDEO IN B RETURN
5	VIDEO IN A RETURN

Pin	Signal
6	VIDEO IN C RETURN
7	AUDIO OUT +
8	VIDEO OUT H-SYNC
9	VIDEO OUT V-SYNC
10	AUDIO OUT –
11	VIDEO OUT RED
12	VIDEO OUT H-SYNC GROUND
13	VIDEO OUT RED GROUND
14	VIDEO OUT V-SYNC GROUND
15	SHIELD
16	VIDEO OUT GREEN
17	SHIELD
18	VIDEO OUT GREEN GROUND
19	VIDEO OUT BLUE
20	VIDEO OUT BLUE GROUND

SeaTalk^{hs} connector

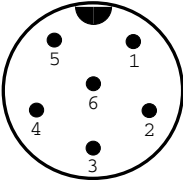


Item	Remarks
Identification	STHS
Connector type	RJ45 (with suitable waterproofing)
Current source to network	No current sourced for external devices
Current sink from network	No power required for interface

Pin	Signal
1	Tx+
2	Tx-
3	Rx+
4	Not connected
5	Not connected
6	Rx-
7	Not connected
8	Not connected

Note: Use only Raymarine cables when connecting to SeaTalk^{hs}

SeaTalk^{ng} connector



Item	Remarks
Identification	ST2/NMEA2000
Connector type	STNG
Current source to network	No current sourced for external devices
Current sink from network	<160mA (Interface drive only)

Pin	Signal
1	+12V
2	0V
3	Screen
4	CanH
5	CanL
6	SeaTalk (not connected on C / E-Series Widescreen)

Note: Use only Raymarine cables when connecting to SeaTalk^{ng}

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